PERFUMES

and Their Preparation

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Containing complete directions for making handkerchief
perfumes, smelling-salts, sachets, fumigating pastils;...

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PERFUMES

AND THEIR PREPARATION.

CONTAINING

COMPLETE DIRECTIONS FOR MAKING HANDKERCHIEF PERFUMES, SMELLING-SALTS, SACHETS, FUMIGATING PASTILS; PREPARATIONS FOR THE CARE OF THE SKIN, THE MOUTH, THE HAIR; COSMETICS, HAIR DYES, AND OTHER TOILET ARTICLES.

WITH A

DETAILED DESCRIPTION OF AROMATIC SUBSTANCES; THEIR NATURE, TESTS OF PURITY, AND WHOLESALE

MANUFACTURE.

BY

GEORGE WILLIAM ASKINSON, DR. CHEM.,

MANUFACTURER OF PERFUMERY.

TRANSLATED FROM THE THIRD GERMAN EDITION BY

ISIDOR FURST.

(WITH CORRECTIONS AND ADDITIONS BY SEVERAL EXPERTS.)

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PREFACE.

The great progress which the art of perfumery has made during recent times is due to several causes, the chief one of which is fully realized only by the manufacturer on a large scale, who stands, as it were, behind the scenes and has access to facts and information concerning the materials he uses, which are not so easily accessible to the dilettante in perfumery, or remain altogether unknown to the latter. This important factor is the advance in our knowledge of the physical and chemical properties of the several substances used in perfumery, whereby we can better discriminate between the genuine and the spurious, the choicest and the inferior, thus insuring, at the very start, a satisfactory result, instead of being compelled to resort to wasteful experimentation and empiricism. A better knowledge has also been gained of the sources of the commercial varieties of many of the crude products, and a better insight into the conditions affecting their qualities or properties. A more exhaustive study of the proximate principles of many of the essential oils has thrown an entirely new light upon this heretofore obscure class of bodies, placing into our hands new products of definite chemical composition, unvarying in physical properties, and many of them valuable additions to the perfumer's stock of ingredients. Synthetic chemistry has also added to the list of materials required by the perfumer, and is surely going to add many more to it hereafter. Though some of these, like the new artificial musk, are not yet in a condition to enter into serious competition with the natural products, yet it is merely a question of time when the latter need no longer be depended upon. The increasing demands for the staple articles used by the perfumer have also caused a large increase in the cultivation of many important plants in various parts of the world, and have led to the establishment of new plantations, in some cases to such an extent that the commercial relations have been entirely revolutionized, new territories producing larger crops and a finer product than the old home of the plant. The exploration of hitherto unknown or imperfectly known countries has also largely added to the perfumer's art, and is likely to continue to do this for a long time to come, since it is now well known that vast districts, more particularly in tropical Africa, are inhabited by a flora abounding in new odoriferous plants.

In spite of all this expansion of the perfumer's stock of trade, however, which results in the periodical introduction of new compounds, there is a very large number of popular odorous mixtures which remain in steady demand, having

taken such firm root among civilized nations that they are not likely to be displaced. It is more particularly with a view to afford information regarding these latter that a work like the present is desirable and necessary. A treatise on perfumery is expected to place into the hands of the purchaser reasonably reliable processes for preparing the most generally approved simple or compound perfumes, as well as accurate information concerning the origin and properties of the various ingredients, together with practical hints regarding the determination of their genuineness and purity.

It is a frequent complaint of those who make preparations after formulas published in works like the present, that they do not succeed in obtaining fully satisfactory products. Another complaint of purchasers of such works is this: that they fail to find formulas yielding preparations identical in every respect with certain celebrated perfumes which have made the reputation and fortune of certain firms. Regarding the first complaint, we would say that the failure lies generally with the complainant himself, through carelessness in the selection of the materials or disregard of the given directions. Concerning the second complaint, a moment's reflection must convince any one that formulas which are the result of the study and experimentation of years, and the products of which are the main stock of trade of certain firms, are carefully guarded, and not likely to be communicated to others. Moreover, in many cases even a publication of the component parts would not be of much avail, for the manufacturer on the large scale has facilities for blending and seasoning his products which the maker on a small scale does not possess, and it is this part of the art particularly upon which the quality of the products depends.

In preparing the present treatise for the American public many changes were found necessary in the original text, in order to make the information given more correct or definite, and so bring the work more abreast of the present time. In addition to various improvements and additions made in the working formulas comprising the second portion of the work, the description of the natural products used as ingredients, upon the quality and selection of which the success of the perfumer mostly depends, has been carefully revised, and so far as the objects of this work required, completed by Dr. Charles Rice, Associate Editor of *American Druggist*, etc., in consultation with several experts in the art of perfumery.

CONTENTS.

Perfumes and their Preparation.

CHAPTER I.
THE HISTORY OF PERFUMERY.

The gratification of his senses is peculiar to man, and it is to this trait that we are indebted for all the arts. The activities which aimed at the gratification of the eye and ear developed into the creative arts and music, and in like manner human endeavor directed toward the stimulation of the sense of smell has in our time assumed the proportions both of an art and a science; for it was nothing but the advancement of chemistry that made it possible to fix all the pleasant odors offered by nature and to create new perfumes by the artistic combination of these scents. The preparation of perfumes is a very ancient art that is met with among all peoples possessed of any degree of civilization. It is particularly the ancient nations of the Orient which had in truth become masters in the manufacture of numerous perfumes.

The first perfume was the fragrant flower; it has continued to be so to the present day: the sprig of dried lavender flowers which we lay in the clothes-press was probably used for the same purpose by the contemporaries of Aristotle. In the Orient, which we may look upon as the cradle of the art of perfumery, the idea suggested itself early to substitute for the delicious fragrance of the flowers some substances of lasting odor; various sweet-scented resins supplied the material for this purpose. The use of these aromatic resins must have been very extensive: the ancient Egyptians alone consumed extraordinary quantities for embalming their dead. How highly the Oriental peoples in general prized perfumes can be learned from the Bible: the Jews (like the Catholics to the present day) employed an aromatic gum-resin (olibanum, frankincense) in their religious ceremonies; in the Song of Solomon mention is made of Indian perfumes, for instance, cinnamon, spikenard, myrrh, and aloes.

Altogether, incense played a prominent part in the religious ceremonies of the ancient Western Asiatic nations—among many peoples under a theocratic government it was even believed to be sinful to use incense for other than religious purposes. The Bible teaches us that Ezekiel and Isaiah protested against it, and that Moses even prescribed the preparation of certain kinds of incense for use in the tabernacle.

Among the most highly civilized people of antiquity, the Greeks, a large number of fragrant substances, as well as oils perfumed with them—that is to

say, perfumes in the same sense as we still understand the term—was known; this will be no surprise to those familiar with the culture of this remarkable people. The odor of violets was the favorite among the Greeks; besides this they used the scent of the different mints, thyme, marjoram, and other aromatic plants. This was carried so far as to become a matter of fashion for the Greek fop to use only certain odors in the form of ointments for the hair, others for the neck, etc. In order to prevent this luxury which was carried to such an excess, Solon even promulgated a law that interdicted the sale of fragrant oils to Athenian men (the law did not apply to the women).

The Romans, who were the pupils of the Greeks in all the arts, carried the luxury with perfumes perhaps even farther. In ancient Rome there was a very numerous guild of perfumers called *unguentarii*; they are said to have had a street to themselves in Capua. A Patrician Roman anointed himself three times daily with precious, sweet-scented oils which he personally took along into his bath in golden vessels of exquisite workmanship, so-called nartheciæ. At the funeral of his wife Poppæa, Nero is said to have used as incense more odorous substances than could be produced in one year in Arabia, at that time the only reputed source of perfumes. This luxury went so far that during the games in the open amphitheatres the whole air was filled with sweet odors ascending from numerous censers arranged in a circle. The apartments of well-to-do Romans always contained large and very valuable urns filled with dried blossoms, to keep the air permanently perfumed.

Roman extravagance with perfumes was carried to such an excess that under the consulate of Licinius Crassus a law was passed which restricted the use of perfumery, there being good reason to fear that there would not be enough for the ceremonies in the temples.

With the migration of the almost savage Huns and Goths, the refinement of morals ceased, progress in civilization was retarded for centuries, and at the same time the use of perfumes disappeared entirely in Europe; but it was otherwise in the Orient. As an instance we may mention the prophecy of Mohammed, who promised in the Koran to the faithful in paradise the possession of black-eyed houries whose bodies were composed of the purest musk.

The Arabs, the ancient masters of chemistry, were also the first founders of the art of perfumery. Thus the Arabian physician Avicenna, in the tenth century, taught the art of preparing fragrant waters from leaves, and Sultan Saladin, in

1157, on his triumphal entry, had the walls of the mosque of Omar washed with rose water.

It was the intercourse with the Orient brought about by the Crusades that made Europeans again more familiar with the art of perfumery, and a number of new odors rapidly became known. Italy and France, in those times the representatives of culture, were the countries in which the preparation of perfumes was carried on on a large scale. Thus, for instance, we find the name of a Roman family preserved to the present day because one of its members had combined a sweet-scented powder, called Frangipanni after its inventor, which is still in favor, and because his grandson Mauritius Frangipanni had made the important discovery that by treating this powder with spirit of wine the fragrant substance could be obtained in a fluid form.

The fact has been frequently related and repeated, that Catherine de Medici, the wife of Henry II., had made use of the fashion of perfuming the body for the purpose of ridding herself of objectionable persons, by giving them scented gloves prepared and at the same time poisoned by a Florentine named René (Renato?). We think this tale to be simply a hair-raising fable—modern chemistry knows no substance the mere touch of which could produce the effect of a fatal poison; and it is scarcely credible that such a material had been known at that time and lost sight of since.

In the sixteenth century, especially at the court of Queen Elizabeth, perfumes were used with great extravagance; in fact, were looked upon as one of the necessaries of life. This luxury was carried still farther at the courts of the sumptuous kings of France; Louis XV. went so far as to demand every day a different odor for his apartments. A lady’s lover always used the same kind of perfume she did.

It is well known that among the Oriental nations perfumes are used so largely that even food is flavored with rose water, musk, etc.; and Indian and Chinese goods always possess a peculiar aroma which is so characteristic for certain products that it was considered to be a sign of genuineness; this was the case, for instance, with the patchouly odor which always adheres to Indian shawls.

A shawl-maker of Lyons, who had succeeded in perfectly imitating Indian shawls with reference to design and colors, spent a fabulous sum to obtain possession of the plant used by the Indian weavers for perfuming their wares. Despite the great outlay caused by the search for this plant, the manufacturer is

said to have done a flourishing business with his “genuine” Indian shawls.

In more recent times the great extension of trade to the farthest countries of the globe, and still more the progress of chemistry, have made us familiar with a number of new perfumes. More than two hundred different aromatic substances are now known, and still they are far from being exhausted; every year new odoriferous plants become known, from which the chemist extracts perfumes. By this means, as well as by the enormous employment of perfumes in all grades of society, the art of their preparation has risen to a higher plane; out of empiricism, which alone prevailed a few decades ago, into the domain of the chemical sciences.

Since the appearance of the last edition of this book, the art of perfumery has made noteworthy progress both with reference to the knowledge of new aromatic substances and to improvement in the methods of their preparation; by the introduction of glycerin, solid and liquid vaselin, and salicylic acid into perfumery, one of its branches—hygienic cosmetics—has made an important advance.

At present it is particularly France and England whose perfumery industry is most extensive and which to some extent rule the markets of the world; southern France and Algiers especially furnish the best raw materials, the finest essential oils for the manufacture of perfumes at the chief centres, Paris and London.

CHAPTER II.
ABOUT AROMATIC SUBSTANCES IN GENERAL.

We apply the term perfume—which really means a fumigating material—to those substances which make an agreeable impression upon our sense of smell; the French call them briefly *odeurs*, *i.e.*, odors. The high degree of development at present attained by this industry in France and England is the cause of the fact that all perfumes are generally sold under French or English names, which must be borne in mind by manufacturers in this country.

Perfumes or scents, however, exert not only an agreeable impression on the olfactory organ, but their effect extends to the entire nervous system, which they stimulate; when used in excess, they are apt to cause headache in sensitive persons; the laborers in the chemical factories where these substances are produced on a large scale, occasionally even suffer by reason of their stimulating action on the nerves. For this reason perfumes should never be employed otherwise than in a very dilute condition; this necessity arises from a peculiarity of the odorous substances which when concentrated and pure have by no means a pleasant smell and become fragrant only when highly diluted. Oil of roses, of orange flowers, or of jasmine, in fact nearly all aromatic substances, have an almost disagreeable odor when concentrated; only in an extremely dilute state they yield those delightful scents which we admire so much in the blossoms from which they are derived.

It will be easier to understand the almost incredible productiveness of perfumes if we cite as an instance that a few centigrams of musk placed on a sensitive scale can for years fill a large hall with their characteristic odor without showing an appreciable loss of weight, and still particles must separate from the musk and become evenly diffused through the air of the hall because the odor is perceptible throughout every part of it.

It would be an error, however, were we to assume that all aromatic substances possess the same degree of productiveness; some of them, as for instance the odorous principle of orris root, have a comparatively faint smell—a fact which must be borne in mind in the combination of perfumes. Even odors having a very similar effect on the olfactory nerves differ widely in their intensity; for instance, true oil (attar) of roses possesses an intensity more than twice as great as that of the rose geranium; many authorities agree in giving the proportion as

three to eight, the first figure being that of rose oil, the second that of oil of rose geranium. Therefore, in order to produce perfumes of equal intensity (having the same effect on the olfactory nerves), we must dissolve in an equal quantity of the menstruum either three parts by weight of the attar of roses or eight parts of the oil of rose geranium.

In the prescriptions for the preparation of perfumes given in this book, these proportions have been carefully weighed; but it will be the office of the trained olfactory sense of the manufacturer to modify them for the various kinds of perfumery in such a way as to produce a truly harmonious pleasant odor.

Although we know many aromatic substances, we are still in ignorance as to the preparation of certain decidedly agreeable odors. Thus no one at present is able to produce the refreshing odor of the sea borne along on the wind, any more than we are able to reproduce the scent exhaled by the forest, especially after a warm rain; chemistry, though it has done much in the domain of perfumery, has thus far thrown no light upon it. Even certain vegetable odors—for instance, the delightful perfume exhaled by some Aroideæ and Primulaceæ—we cannot as yet preserve unchanged in perfumery. This opens an illimitable field for future activity to the progressive manufacturer.

In a book devoted to the production of perfumes it would certainly be in place to say something about the physiological relations of the olfactory sensations; but unfortunately this interesting part of physiology is still enveloped in great obscurity. All we know positively on this subject is that many particles of the odorous bodies evaporate and must come in contact with the olfactory nerves in order to produce the sensation of odor. There is no lack of experiments seeking to draw a parallel between sensations of smell and those of hearing, and, as is well known, we speak of a harmony and dissonance of odors as we do of tones. Piesse, the renowned perfumer, has even made an attempt to arrange the different odors in a “harmonic scale” having the compass of the piano, and to deduce therefrom a law for the mixture of the several aromatic substances. This attempt, although very ingenious, still lacks a scientific foundation. Piesse endeavors to combine the several scents like tones to produce chords in different scales; the chords of odors are to agree with those of tones. Thus far, however, no proof has been furnished that the olfactory nerve and the acoustic nerve have the same organization, and under this supposition alone could Piesse’s system be accepted as correct.

THE DIVISION OF AROMATIC SUBSTANCES ACCORDING TO THEIR ORIGIN.

The majority of the substances used in perfumery are derived from the vegetable kingdom, but some come from the animal kingdom, and for others which do not occur complete in nature we are indebted to chemistry. As is well known, most blossoms possess a decided odor, which is extremely fragrant in some; yet it is not the blossoms alone, but in different genera various parts are distinguished by agreeable odors. In some plants the fragrant substances are contained in every part, as in different pines and the mints; in others, only in the fruits (nutmeg, vanilla), while the other parts are odorless; in certain plants only the rinds of the fruits contain an aromatic substance (oranges, lemons). In the Florentine Iris the entire plant is odorless—only its root stock possesses an agreeable, violet-like scent; while, for instance, in the camphor-tree an aromatic substance exists in the wood, in the cinnamon laurel in the bark, in the clove-tree mainly in the closed buds.

But taking the aromatic plants all together, we find that it is particularly their flowers which contain the finest odors, and that the majority of perfumes are prepared from their blossoms.

From the animal kingdom we take for the purposes of perfumery only a very small number of substances, among which, moreover, some peculiar relation exists; while, for instance, all men would call the odor of violets, roses, vanilla, etc., agreeable, the odor of some animal substances is decidedly obnoxious to many persons, though others like it—an observation which can be verified often with reference to musk.

With the advancement of science, chemical products find application in ever increasing numbers; among them are substances which owe their origin directly to the vegetable kingdom, while others, such as nitrobenzol and pine-apple ether, are only indirectly derived from it.

From what has been stated, we learn that our attention must be directed particularly to those scents which are derived from the vegetable kingdom. To the manufacturer of perfumery, however, it is a matter of importance whence the plants are obtained which he uses for the preparation of the odors; a very slight change in the soil often makes a great difference in the quality of one and the same species; we see this quite clearly in our ordinary strawberry. While the wild fruit is but small in size it has a delightful aromatic flavor, and the same species transplanted into gardens attains much greater size but possesses only a faint aroma not to be compared with that of the wild variety. The Lombardian violet is large and beautiful, but the German has a much more pleasant odor. On the other

hand, the blossoms of the orange-tree obtained from the plants cultivated in pots cannot be compared with reference to their odor with these growing in the Riviera, the strip of coast land of the Mediterranean from Marseilles to Genoa. Altogether the last-named region and the south of France may be called the true garden of the perfumer; in the neighborhood of Grasse, Cannes, Nice, Monaco, and some other towns, extensive plots of ground are set with aromatic plants such as orange-trees, Acacia farnesiana, jasmine, violets, etc., whose products are elaborated in large, well-appointed chemical factories solely devoted to the extraction of their odors. The proximity of the sea-coast, with its favorable climate almost free from frost, permits the cultivation of southern plants, while in the more elevated parts of the country the adjoining Maritime Alps cause a more changeable climate which adapts them to certain other sweet-scented plants.

The great value of the annual production of the French flower farms at Cannes, Grasse, and Nice will be evident from the following figures. The harvesting and elaboration of the flowers at the points named give employment to fifteen thousand persons, and the average annual production is:

Orange flowers,	2,000,000	kgm.,	valued at	2,000,000	francs.
Roses,	500,000	"	"	500,000	"
Jasmine,	80,000	"	"	200,000	"
Violets,	80,000	"	"	400,000	"
Acacia flowers,	40,000	"	"	160,000	"
Tuberoses,	20,000	"	"	80,000	"
	2,720,000	kgm.,	valued at	3,340,000	francs.

From these flowers were manufactured: 500,000 kgm. of pomades and essences, 1,000,000 litres of orange-flower water, 100,000 litres of rose water, and 1,200 kgm. of oil of roses.

Besides, in more northern countries we find here and there quite an extensive cultivation of aromatic plants; this is the case, for instance, in England, where lavender, crisp mint, and peppermint are planted on a large scale solely for their perfume. In northern Germany, too, we sometimes find caraway and sweet flag cultivated, for their peculiar odors only, in special fields.

As stated above, the place of growth of a plant exerts a powerful influence on the quality of the odors developed in it; this circumstance may be the reason why

certain scents are prized most highly when they are derived from some definite regions, because the buyer is sure that the product from such places is of superior excellence.

Thus we find that English oils of lavender and peppermint are valued more highly and bring better prices than those from other points of production; some places even have, as it were, acquired a monopoly of certain odors. While the factories at Cannes produce the most perfect odors of roses, orange flowers, jasmine, and cassie, those at Nice are famous for the finest odors of violet, reseda (mignonette), and tuberose, and those of Italy for the odors of bergamot and orris root.

Unfortunately there are in the United States no extensive places of cultivation for odoriferous plants, although certain localities are very well adapted to the growth of violets, mignonette, roses, syringa, lavender, etc. Peppermint, however, is grown on a large scale in some parts of New York State and in Michigan. Of course such an enterprise, in order to be profitable, requires the intelligent co-operation of planters and duly qualified chemists, besides well-furnished laboratories and a considerable amount of capital; but under these conditions the prospects of gain are good.

At present the manufacturers of perfumery are almost entirely dependent upon English and French factories for their supply of odors. Owing to the absence of competition, the prices for the products, excellent though they are, are high, and become still more so when the crops are short. These conditions would be materially altered under active competition.

As indicated above, the odors used in perfumery may be divided into three distinct groups according to their origin. These groups are:

1. Odors of vegetable origin.

2. Odors of animal origin.

3. Odors of artificial origin—chemical products.

Before describing the preparation of true perfumes, it is necessary to become acquainted with the several raw materials required in their manufacture; that is to say, the simple odorous substances, their origin, their preparation, and their peculiar qualities. Besides these odorous raw materials, the art of perfumery makes use of a number of chemical and mineral products, whose quality largely

influences that of the perfume to be made. These, therefore, likewise call for an appropriate description. Among these auxiliary substances are alcohol, glycerin, fixed oils, and solid fats, which play an important part not only in the preparation of the perfumes, but also enter into the composition of many. The liquid handkerchief perfumes always contain a large quantity of alcohol, the scented hair oils consist largely of fixed oils, while solid fats of animal or vegetable origin occur in the so-called pomades. As we shall see, the actual odors, owing to their extraordinary productiveness, constitute generally only a small percentage of the perfumes; the greatest bulk is usually either alcohol, fixed oil, or solid fat.

Hence, as the last-named substances, aside from the odoriferous materials, form the foundation of all articles of perfumery, the manufacturer must devote particular attention to their purity, and their qualities must be discussed in detail.

CHAPTER III.
ODORS FROM THE VEGETABLE KINGDOM.

The odors occurring in plants have their seat mostly in peculiar receptacles called oil glands in which the aromatic substances are stored and seem to take no further part in the vital processes of the plant. As has been intimated, the parts of the plant in which the aromatic substances are stored differ greatly; but in general it may be said that in most cases the flowers and fruits contain the odors; more rarely they may be found in the roots, in the bark, or in the wood, and in very few instances equally distributed throughout the whole plant. In some cases, however, we can obtain totally different odors from various parts of the same plant; this applies, for instance, to the orange-tree, whose blossoms furnish a different odor from the ripe fruits, and the latter must be distinguished from that obtainable from the leaves. The odorous substances occurring in the vegetable kingdom are either mobile liquids (essential oils), or they have a thicker consistence ranging from that of cream to that of soft cheese (balsams or gum-resins), or they are solid (resins). Aside from the fact that the term "essential oils" is quite incorrect, since the substances called by that name have nothing in common with oils except perhaps the liquid state, we are forced from a chemical standpoint to include among them even solid substances; the well-known camphor, a firm and waxy-looking body, belongs according to all its chemical properties into the same group as the so-called essential oils. The name "essential (or volatile) oils" is due to the fact that the volatile vegetable aromatic substances cause a stain on paper similar to that produced by oils and fats; but the stain made by the former disappears spontaneously after some time, while that due to true oils and fats persists. The disappearance of the stain depends on the evaporation of the vegetable aromatic substances—a quality not possessed by fats. Hence the volatile vegetable aromatic substances, in contradistinction from non-volatile fixed or fatty oils, have been designated as essential or volatile or ethereal oils. Inasmuch as the latter terms are the ordinary trade names for these substances, we are compelled to retain them despite their incorrectness. The French name for essential oils is *essences*; "essence de lavande," for instance, is the French name for essential oil of lavender, and not for an alcoholic solution of the oil, as might be inferred from the usually accepted meaning of the English terms "essence of lavender," "essence of peppermint," etc., which mean solutions of these essential oils in alcohol.

As the localities where the raw materials—that is, the aromatic plants—are cultivated on a large scale naturally constitute the places of manufacture of essential oils, we find in southern France and in England the most extensive factories devoted exclusively to the preparation of perfumes. In the countries named, a favorable influence is exerted, too, by their situation near the sea, as well as by their trade with tropical lands from which additional aromatic plants are imported.

We have stated above that the manufacture of essential oils forms almost a monopoly in France and England; but there is no doubt that this country (the United States) likewise possesses many localities favorable to the cultivation of certain aromatic plants and the preparation of essential oils from them, so that this branch of industry could be carried on at a profit. For this reason we have in our descriptions devoted some attention to the conditions of growth required by such plants as might be raised here. We even find that some advantages are derived from the hot-house cultivation of some tropical plants.

An exact knowledge of the chemical properties of a substance is in all cases the first and fundamental condition for its preparation; it would appear necessary, therefore, that we should endeavor to gain complete information about the nature of vegetable aromatic substances before we enter upon the description of the various methods of their preparation.

The Chemical Constitution of Vegetable Aromatic Substances.

The sources of the odors derived from the vegetable kingdom can be divided, as stated above, into so-called essential oils, balsams, gum-resins or soft resins, and hard resins. Since the latter bear a certain relation to the essential oils from which they are formed through chemical combinations, we must consider them first.

The flowers, the fruits and their rinds, or even the wood of some plants form the receptacles of essential oils; if they are liquid they are called essential oils *par excellence*; if they are firm they are called camphors. Besides, there are intermediate states between them: oil of rose is always viscid and solidifies even at temperatures considerably above the freezing-point of water (see under Oil of Rose).

The bodies which are generally called essential oils are usually mixtures of a hydrocarbon with an oxygenated body, or an unchanged oil with another which

has become altered by the influence of the oxygen of the air—a condition to which we shall recur later on. With reference to their elementary composition, essential oils may be divided into two groups:

1. Non-oxygenated essential oils.

2. Oxygenated essential oils.

The non-oxgenated essential oils consist only of two elements—carbon and hydrogen; the other group, as the name indicates, contains a third element in chemical combination, and consist of carbon, hydrogen, and oxygen. Most of the essential oils of the first group have the same chemical composition: $C_{10}H_{16}$ (10 atoms of carbon combined with 16 atoms of hydrogen). Despite the like chemical composition, all the essential oils display different physical qualities; they vary in density, in refractive power, in boiling-point (often by many degrees), and, a matter of the greatest importance for our purposes, in their odor. We may state at once that but few essential oils can be said to have a pleasant odor; that of most of them is even disagreeable and narcotic to the olfactory nerves; it is only after the oil has been extremely diluted that the odor begins to become pleasant and to resemble that of the plant from which the oil was derived.

According to their physical qualities, essential oils may be described as fluids of a specific narcotic odor, colorless but very refractive, and easily inflammable. Only a few essential oils can be produced in such a state of purity as to appear perfectly colorless; usually they are more or less dark yellow in color, and some even possess a characteristic tint; thus oil of acacia is reddish-brown, oils of rose and absinth are green, oil of chamomile is blue. But a simple experiment will show that the color is not inseparably connected with the oil, for certain tinted oils can be obtained perfectly colorless by being distilled with another, less volatile oil which retains the coloring matter.

The boiling-point of essential oils is in general very high —between 160° and 288° of the centigrade thermometer (C.), or 320° to 550° F. The fact that we smell the essential oils in aromatic plants so distinctly despite their high boiling-point is an evidence of their exceedingly strong influence on the olfactory nerves.

A peculiar property of essential oils, which is of great importance in their preparation, is that of distilling over in large quantities with steam—both ordinary and superheated—that is, at temperatures at most only slightly

exceeding 100° C. or 212° F. For this reason essential oils are usually obtained in this way, since they are but slightly soluble in water. Still, most of the oils dissolve in water in sufficient amount to impart to it their characteristic odor and thus to render it often very fragrant. Aqua Naphæ triplex (orange-flower water), rose water, etc., are such as have been distilled over with the essential oils, contain a small quantity of the latter in solution, and hence have a very agreeable odor.

All essential oils dissolve readily in strong alcohol, petroleum ether, benzol, bisulphide of carbon, in liquid and solid fats, in glycerin, etc.; we shall again recur to this important subject under the head of the preparation of the essential oils.

If a freshly prepared essential oil is at once excluded from the air by being placed in hermetically sealed vessels which it completely fills, and is kept from the light, the oil will remain unchanged for any length of time. But if an essential oil is exposed to the air, a peculiar, chemical alteration begins, which proceeds more rapidly and obviously if direct light acts upon the oil at the same time. The odor becomes less intense, the oil grows darker in color and more viscous, and also acquires a peculiar quality: it has a strong bleaching effect which is easily seen on the cork closing the bottle, which is beautifully bleached. After a certain time the oil changes to a viscid, less odorous mass, into balsam, and the latter, after the prolonged influence of the air, finally changes into a brownish, odorless substance, into resin.

These remarkable physical and chemical alterations depend on the fact that the essential oil absorbs oxygen from the air, which it puts into a peculiar condition in which it exerts increased chemical activity and is termed ozonized oxygen. One of the most marked of these effects is the uncommonly strong bleaching power of ozonized or active oxygen. When an essential oil that has altered so far as to contain ozonized oxygen—which is shown by its bleaching vegetable coloring matters such as the juice of cherries, red beets, tincture of litmus, etc., agitated with it—is cooled, we notice the separation from it of a usually crystalline, colorless, and odorless body called stearopten, while the remaining liquid part is called elæopten. Stearopten always contains oxygen, while elæopten still consists only of carbon and hydrogen.

In the formation of the stearopten we distinctly see the beginning process of resinification, which, therefore, is nothing but an oxidation (combination of the essential oil with oxygen). It should, however, be stated that as to many essential

oils this is not proven by actual observation. Many of them are not known to us as naturally existing without any stearopten. Balsams are essential oils which have to a great extent changed into resin, which they contain in solution, and thereby have become more or less viscid. If the process of oxidation goes still farther, eventually the greater portion of the essential oil becomes oxidized, the entire mass grows firm, and then possesses only a very faint odor which is due to the last remnants of the unchanged essential oil.

Since aromatic substances during evaporation become mixed with air, it appears probable that they act upon the olfactory nerves only at the moment when they become oxidized.

The entire process of resinification of oil of turpentine can be followed very clearly on the pitch pine (Pinus austriaca, or other species of Pinus), just as oil of turpentine in general can be taken as an example of an essential oil on which the peculiarities of the non-oxygenated essential oils may be easily studied. In many localities the pitch pine is partly deprived of its bark when it has reached a certain age. From the trunk exudes oil of turpentine which in the air becomes more and more viscid by the absorption of oxygen and changes into balsam, called turpentine. The latter is collected and distilled with water, when the unchanged oil of turpentine passes over with the steam, while the odorless resin (rosin or colophony) remains behind in the stills.

The above-mentioned qualities of the essential oils indicate naturally how those used in perfumery, which are often very costly, are to be preserved. For this purpose small strong bottles should be chosen which are closed with well-fitting glass stoppers, over which is applied a glass capsule ground to fit tightly over the neck of the bottle. *These bottles should always be completely filled* (hence small bottles should be selected), *and kept tightly closed, in the dark*. As the action of oxygen is retarded by low temperatures, it is advisable to keep bottles containing essential oils in a cool cellar. But care must be had never to pour out an essential oil in the cellar near an open candle light. The vapors are very apt to take fire, as they are quite inflammable.

As there are a great many aromatic vegetable substances, so there are numerous odors, or, to retain the customary though incorrect appellation, numerous essential oils. All of these, however, cannot be used in the art of perfumery, as some of them do not possess a pleasant odor, as is the case, for instance, with oil of turpentine. (We may state here, however, that very pure oil of turpentine, distilled from certain Coniferæ, has an agreeable, refreshing odor

which at present has found application in perfumery under the title of forest perfume or pine-needle essence.) Besides, there are numerous essential oils which, while possessing a very pleasant odor, still cannot be used in perfumery except for very cheap preparations, though they are employed in much larger quantities in the manufacture of liqueurs. Such oils are: oil of cumin, fennel, juniper, absinth, etc.

As we shall return to this subject in connection with the essential oils which are used in perfumery in general, we will now consider at greater length the aromatic vegetable substances which are employed for the manufacture of fragrant odors.

CHAPTER IV.
THE AROMATIC VEGETABLE SUBSTANCES EMPLOYED IN PERFUMERY.

Every fragrant portion of a plant can be used for the preparation of an aromatic substance, and therefore for the manufacture of a perfume. Hence we are unable, in the following enumeration of the aromatic vegetable substances, to make any claim to absolute completeness; for every new scientific expedition may acquaint us with hitherto unknown plants from which the finest odors may be obtained. We have said above that we have not yet even fixed in our perfumes all the odors of the known aromatic plants, and therefore there is still a large field open to the progressive manufacturer.

In the following pages we must restrict ourselves to the description of those aromatic vegetable substances which are used in the laboratories of the most advanced and scientific perfumers for the manufacture of odors. At the same time we lay particular stress on the fact that the knowledge of these raw materials is a matter of the greatest importance to the manufacturer of perfumes because it enables him to appreciate the differences, often very minute, between fine and inferior qualities. Every manufacturer who aims at the production of fine goods must make it the rule to use nothing but the best raw materials.

The price of the latter is apparently disproportionately high; for all that, only the most expensive materials should be bought, for it is the only kind that can be used. Let us give but two instances in illustration. We find in the market, grades of vanilla the prices of which are as one to four; the latter is fresh and contains the aromatic substance in large amount; the former is old, dry, and worthless, with an artificial glossy surface and little odor. The differences in the price are still greater in an aromatic substance of animal origin, musk, the cheapest grades of which are altogether artificial and perfumed with a mere trace of genuine musk.

Of course, the same remark applies to the raw materials of animal origin and to the chemical products, all of which should be of the greatest purity obtainable.

The aromatic substances at present employed in perfumery for the extraction of odors are the following.

Allspice.

***Latin*—Pimenta; *French*—Piment; *German*—Piment; Nelkenpfeffer.**

This spice consists of the fruit berries, at first green, later black, of the Eugenia Pimenta, indigenous to Central America and the Antilles. It is chiefly used in the manufacture of liqueurs, less in perfumery, though it may be employed as an addition to certain strong odors, particularly that of oil of bay; it serves very nicely for scenting cheap soap.

Anise.

***Latin*—Pimpinella Anisum; *French*—Anis; *German*—Anis.**

This well-known plant, which is cultivated in many localities on a large scale, belongs to the Order of Umbelliferæ. The seeds contain about three per cent of a very aromatic essential oil which finds application in the manufacture of soap and in cheap perfumery; it is chiefly used as a flavoring for liqueurs. Good anise must have a light green color, an agreeable sweetish odor, and a sharp taste. In order to increase the weight, anise is occasionally moistened with water; such seeds look swollen, are apt to become slimy, and then furnish a less fragrant oil. Anise is not to be confounded with star-anise, which will be mentioned hereafter.

Balm.

***Latin*—Melissa officinalis; *French*—Melisse; *German*—Melissenkraut.**

Melissa officinalis, an herbaceous plant with large, beautiful flowers, which grows wild in our woods, contains a very sweet-smelling oil in small quantities. This can be extracted by distillation from the fresh herb, and furnishes very fine perfumes.

Oil of Melissa of the market is, however, usually an East Indian oil, derived from Andropogon citratus. See under Citronella.

Bay (Sweet Bay).

***Latin*—Laurus nobilis; *French*—Laurier; *German*—Lorbeerfrüchte.**

The fruits of the bay-tree contain much essential oil which is used less in the manufacture of perfumery than for scenting soap. Venice is the most important point of export. See the next article.

Bay (West Indian).

***Latin*—Myrcia acris; *French*—(Huile de) Bay; *German*—Bay (-Oel).**

The essential oil obtained from the leaves of this tree, a native of the West Indies, possesses a very aromatic, refreshing odor somewhat resembling that of allspice. It is known in the market as bay oil or oil of bay. During the last decade or so its use has largely extended, and, while formerly almost unknown on the continent of Europe, has become an important article for the perfumer. An alcoholic distillate, prepared by distilling the fresh leaves with the crude spirit from which rum is otherwise obtained, is known as bay-rum, and is used as a pleasant and refreshing wash for the skin. Bay-rum may also be made by dissolving the oil, together with certain other ingredients, in alcohol.

Benzoin.

***Latin*—Benzoinum; *French*—Benjoin; *German*—Benzoëharz.**

This gum-resin, which possesses a pleasant vanilla-like odor, comes from a tree belonging to the Order of Styracaceæ, the Styrax Benzoin, and probably another species of Styrax, indigenous to tropical Asia, especially Siam and Sumatra. The collection of benzoin is very similar to that of pine resin; the bark of the tree is cut open, the exuding juice is allowed to harden on the trunk, and is thus brought into commerce. Benzoin differs according to its origin, the age of the tree, etc., and in commerce a number of sorts (Siam, Penang, Palembang, and Sumatra) are distinguished. As a rule, benzoin comes in lumps ranging in size to that of a child's head. They are of a light gray color and inclose white, almond-shaped pieces. The finest quality, known as Siam benzoin after its source, usually is in small pieces (Siam benzoin in tears) which are translucent, light yellow to brown externally, but milky white on fracture, and have a strong vanilla odor. Less fine but still very good is Siam benzoin in lumps, consisting of large reddish-brown pieces inclosing white particles. All other kinds mentioned above come from the island of Sumatra, in lumps the size of a fist. What was formerly known as Calcutta benzoin formed large friable pieces of a dirty reddish-gray color. Siam as well as Penang benzoin often contains, besides benzoic acid, also cinnamic acid; it is not known why it is not a regular constituent. The worst quality is sold as "benzoin sorts," consisting of brownish pieces without white spots; they are often mixed with splinters of wood, bast fibres, and fragments of leaves, and can be used only for cheap perfumes.

Good benzoin, besides the qualities named, must have a sweetish and burning sharp taste, it should be very friable, and when heated in a porcelain capsule should emit vapors (benzoic acid) of an acrid taste and a pronounced aromatic odor; it should dissolve completely in strong alcohol. In perfumery, benzoin serves for the preparation of many odors, washes, and the manufacture of

benzoic acid. The latter will be further discussed under the head of aromatic substances obtained by means of chemistry.

Bergamot.

***Latin*—Citrus Bergamia; *French*—Bergamote; *German*—Bergamottefrüchte.**

The bergamot is the fruit of a tree belonging to the Order of Aurantiaceæ, which is cultivated in Calabria. The tree is unknown in a wild state. The golden-yellow or greenish-yellow fruits, resembling a lemon in shape, have a bitter and at the same time acid pulp; the thin rind contains a very fragrant oil which is used largely in the manufacture of fine perfumery and soaps, and is exported chiefly from Messina and Palermo.

Bitter Almonds.

***Latin*—Amygdala amara; *French*—Amandes amères; *German*—Bittere Mandeln.**

The well-known fruits of the bitter almond-tree (Amygdalus communis, var. amara). There are no definite botanical differences between the sweet and the bitter almond-tree. The only distinct difference is the character of the respective fruits. The aromatic substance obtained from bitter almonds is not present fully formed in the fruits, but results from the chemical transformation of the amygdalin they contain; the latter body is absent in sweet almonds.

Cajuput Leaves.

***Latin*—Folia Cajuputi.**

The leaves of Melaleuca Cajuputi, a tree found in the Indian and Malay Archipelago, which have an aromatic odor resembling that of cardamoms. In the Orient the leaves are used as incense and for the extraction of the oil they contain.

Camphor Wood.

***Latin*—Lignum Camphoræ; *French*—Bois de camphre; *German*—Campherholz.**

The wood of the Camphor-tree, native of China and Japan, is exceedingly rich in essential oil, the firm, white, and strong-scented camphor. The latter is usually prepared from the wood at the home of the tree, especially in Formosa and Japan, so that the wood hardly forms an article of commerce and is here enumerated only for completeness’ sake. In China and in Japan, however, it is largely used for the manufacture of cloth-chests, trunks and wardrobes, as these are never invaded by insects.

Caraway Seed.

***Latin*—Semen Carvi; *French*—Carvi; *German*—Kümmelsamen.**

This plant, Carum Carvi, which is largely cultivated in Germany, contains in its seeds from four to seven per cent of essential oil which is extracted by distillation. Genuine caraway seed is brownish-yellow, pointed at both ends, quite glabrous on examination with a lens, and marked with five longitudinal ribs. Caraway is occasionally confounded with cumin seed, from Cuminum Cyminum, which is easily recognized with a lens: the seeds of the latter plant have fourteen longitudinal ribs and are hairy. The use of caraway in perfumery is limited to ordinary goods, but in the manufacture of liqueurs it is largely employed.

Cascarilla Bark.

***Latin*—Cortex Cascarillæ; *French*—Cascarille; *German*—Cascarillarinde.**

This is the bark of a West Indian tree, Croton Eluteria, belonging to the Order of Euphorbiaceæ, native of the Bahamas. It occurs in commerce in the shape of pieces the length and thickness of a finger; externally it is white and fissured, internally of a brown color and resinous. Good qualities should be free from dust and fractured pieces (sifted cascarilla), of a warm aromatic taste, and a very agreeable odor which becomes more marked on being heated. Another variety of cascarilla derived from South Africa, Cascarilla gratissima, has very fragrant leaves which can be used immediately as incense, just as cascarilla in general is employed in perfumery chiefly for fumigating powders and waters.

Cassie.

***Latin*—Acacia farnesiana; *French*—Cassie; *German*—Acacie.**

The flowers of Acacia farnesiana (Willd.), one of the true acacias, native of the East Indies, which flourishes farther north than the other varieties, cultivated largely in southern France for the delightful odor which resembles that of violets but is more intense. The flowers are collected and made to yield their odorous principle by one of the methods to be described hereafter. The plant which is generally but falsely called Acacia in this country, viz., Robinia pseudoacacia, likewise bears very fragrant flowers which undoubtedly can be made to yield a perfume by some one of the usual methods; but so far we know of no perfume into which the odor of Robinia flowers enters. Moreover, it is not alone the flowers of Acacia farnesiana which may be utilized for the preparation of the cassie perfume; the black currant, Ribes niger, contains in its flowers an odor

closely resembling the former; this is actually used in the preparation of an oil sold under the name of “oil of cassie.” The latter plant flourishes in our northern States and would answer as a substitute for Acacia farnesiana, which cannot stand our northern winters.

Cedar Wood.

***Latin*—Lignum Cedri; *French*—Bois de cèdre; *German*—Cedernholz.**

The wood met with in commerce is derived from the Virginian juniper tree, Juniperus virginiana, which is used in large quantities for inclosing lead pencils. The chips, the offal from this manufacture, can be employed with advantage for the extraction of the essential oil contained therein. Long uniform shavings of this wood are also used for fumigation, and the sawdust for cheap sachet powders. Cedar wood is reddish-brown, fragrant, very soft, and splits easily. In the perfumery industry it usually passes under the name of the “cedar of Lebanon,” although the wood from the last-mentioned tree (Cedrus libanotica) has quite a different agreeable odor, is very firm, reddish-brown, and of a very bitter taste—qualities by which it is readily distinguished from the other.

Cinnamon.

***Latin*—Cinnamomum; *French*—Canelle; *German*—Zimmtrinde.**

Cinnamon consists of the bark of the young twigs of the cinnamon-tree, Cinnamomum zeylanicum, indigenous to Ceylon. Good cinnamon consists of thin, tubular, rolled pieces of bark which are smooth, light brown (darker on fracture), of a pronounced characteristic odor, and a burning and at the same time sweet taste. The most valuable in commerce is that from Ceylon; the thicker bark is less fine.

Chinese cinnamon or cassia (French, Cassie; German, Zimmtcassia) consists of the bark of the cassia-tree, an undetermined species of Cinnamomum indigenous to Southern China; this is grayish-brown and has the general properties of true cinnamon, but it as well as the oil extracted from it has a less fine odor than cinnamon or oil of cinnamon. A very fine kind of Cinnamon has for a number of years past appeared on the market under the name of Saigon cinnamon. It is very rich in oil, and is exported from Cochin-China. Besides the true oils of cinnamon and cassia, other essential oils are met with in commerce under the names of oil of cinnamon flowers and oil of cinnamon leaves, but their odor is not so fine as that of the former. The so-called cinnamon flowers are the unripe fruits of various cinnamon laurels, collected after the fall of the blossoms.

They form brownish cones the length of the nail of the little finger, and furnish an essential oil whose odor resembles that of cinnamon.

CITRON.

***Latin*—Fructus Citri; *French*—Citron; *German*—Citronenfrüchte.**

The fruit of a tree, Citrus medica, indigenous to northern India, but largely cultivated in the countries situated around the Mediterranean and in other countries. It is cultivated both for the pleasant acid juice of the fruit and for their fragrant rinds. Only the latter are of value for our purposes. It occurs in European commerce under the name of Citronat or citron peel. Good commercial citron peel should be in quarters and as fresh as possible, which is shown by its softness, the yellow color, and the strong odor. Old peel looks shrunken and brownish and has but little pleasant odor.

CITRON FLOWERS.

***Latin*—Flores Citri; *French*—Fleurs de citron; *German*—Citronenblüthen.**

The flowers of the citron-tree (Citrus medica) are white, fragrant, and contain a very aromatic essential oil; but as the oil is always extracted from the fresh flowers, the latter do not form an article of commerce.

CHERRYLAUREL LEAVES.

***Latin*—Folia Laurocerasi; *French*—Laurier-cérise; *German*—Kirschlorbeerblätter.**

The leaves of this tree (Prunus Laurocerasus), which is largely cultivated for officinal purposes, furnish an odorous substance completely identical with that contained in bitter almonds, or, rather, formed in them under certain conditions. As the extraction of the odorous substance from bitter almonds is much cheaper, cherry-laurel is but rarely used.

CITRONELLA.

***Latin*—Andropogon Nardus; *French*—Citronelle; *German*—Citronella.**

This grass, which, like the oil prepared from it, is called citronella, is a native of northern India, and is largely cultivated in Ceylon, where large quantities are worked for the oil; for this reason the grass itself is seldom met with in commerce. Its odor is somewhat similar to that of the Indian lemon grass, that of verbena, and that of several other aromatic plants, in place of which citronella is frequently employed.

Much confusion exists in much of the current literature regarding the source and synonymy of the Indian grass oils and allied products. The following list contains the most important ones:

1. *Andropogon citratus* DC.—Lemon Grass. The oil is known as Lemon Grass Oil, Indian Verbena Oil or Indian Melissa Oil, or simply Oil of Verbena or Oil of Melissa.

2. *Andropogon laniger* Desf.—This is the Juncus odoratus or Herba Schoenanthi of older pharmacy. No oil is prepared from this.

3. *Andropogon muricatus* Retz.—Cuscus or Vetiver. Source of Oil of Vetiver.

4. *Andropogon nardus* L.—Citronella. Source of Oil of Citronella.

5. *Andropogon Schoenanthus* L.—Ginger Grass. The oil is known as Oil of Ginger Grass, Oil of Geranium Grass, Oil of Indian Geranium or simply Oil of Geranium, also Oil of Rose Geranium [“Rose” is here a corruption of the Hindostanee name of the plant, viz., Rusa], Oil of Rusa Grass, Oil of Rusa, Oil of Palmarosa.—The two terms “Oil of Geranium” and “Oil of Rose Geranium” should be abandoned for this oil, to avoid confusion with the “Oil of (Rose) Geranium” obtained from Pelargonium. See under “Geranium.”

CLOVE.

***Latin*—Caryophylli; *French*—Clous de girofle; *German*—Nelkengewürz.**

This well-known spice comes from a tree, Caryophyllus aromaticus, native of the Moluccas, and largely cultivated at Zanzibar, Pemba, and elsewhere. It consists of the closed buds. The main essential of good quality is the greatest possible freshness, which may be recognized by the cloves being full, heavy, reddish-brown, and of a fatty aspect, and they must contain so much essential oil (about 18 per cent) that when crushed between the fingers the latter should be stained yellowish-brown. Before buying, this test should always be made, and attention paid to the fact whether the whitish dust is present in the wrinkles about the head. We have found in commerce cloves from which the essential oil had been fraudulently extracted with alcohol and hence were worthless; such cloves may be recognized by the faint odor and taste, but especially by the absence of the whitish dust.

CUCUMBER.

***Latin*—Cucumis sativus; *French*—Concombre; *German*—Gurke.**

The well-known fruits of this kitchen-garden plant, though not strictly sweet-scented, possess a peculiar refreshing odor which has found application in perfumery. Certain products belonging under this head require the odor of cucumber, and therefore this plant is to be included among the aromatic plants in a wider sense.

CULILABAN BARK.

***Latin*—Cortex Culilavan; *French*—Ecorce culilaban; *German*—Kulilabanrinde.**

The bark of Cinnamomum Culilavan Nees, a plant indigenous to the Molucca islands, used to occur in commerce in the shape of long, flat pieces of a yellowish-brown color, with an odor like a mixture of cinnamon, sassafras, and clove oils. It is rarely met with now.

DILL.

***Latin*—Semen Anethi; *French*—Aneth; *German*—Dillsamen.**

This plant, Anethum graveolens, which is indigenous to the Mediterranean region and southern Russia, contains in all its parts, particularly in the seeds, an oil of a peculiar odor, which is used as a perfume for soap, also in cheap perfumery, and especially as a flavoring for liqueurs.

ELDER FLOWERS.

***Latin*—Flores Sambuci; *French*—Sureau; *German*—Hollunderblüthen.**

This bush, Sambucus niger, which grows wild in Europe, bears umbellar flowers which are officinal, but contain besides a pleasant odor which can be extracted from them. The odor of the flowers deteriorates on drying, hence in perfumery only the fresh flowers should be used. The American elder (Sambucus canadensis) could easily be used in place of it.

FENNEL (SEED AND HERB).

***Latin*—Fœniculum; *French*—Fenouil; *German*—Fenchel.**

This plant, Fœniculum vulgare, Order Umbelliferæ, is largely cultivated in Europe. It contains an essential oil in all its parts, but especially in the seeds. The plant is rarely used in perfumery, but more frequently in the manufacture of liqueurs. The herb, dried and comminuted, enters into the composition of some cheap sachets.

FRANGIPANNI (see Plumeria).

GERANIUM.

***Latin*—Pelargonium roseum; *French*—Géranium; *German*—Geranium.**

This plant, originally indigenous in South Africa, contains in its leaves an essential oil whose odor closely resembles that of roses. At present it is cultivated on a large scale in many parts of France and in Turkey, solely for the purposes of perfumery. This plant would grow freely in our Southern and Middle States, and could be cultivated with advantage for the extraction of its highly valued perfume.

The terms “Oil of Geranium” and “Oil of Rose Geranium” ought to be restricted in commerce to the oil obtained from true geranium (Pelargonium). Unfortunately, they are yet very commonly applied to an East Indian oil obtained from a species of Andropogon (see under Citronella).

Hedyosmum Flowers.

On the Antilles there are a number of bushes belonging to the Genus Hedyosmum, Order Chloranthaceæ, whose flowers possess a magnificent, truly intoxicating odor. Thus far these odors seem to have been accessible only to English perfumers. The perfumes sold under this name by Continental manufacturers are merely combinations of different odors.

HELIOTROPE.

***Latin*—Heliotropium peruvianum; *French*—Héliotrope; *German*—Heliotropenblüthen.**

The flowers of this plant, which flourishes well in all temperate or tropic countries, possess a very pleasant odor, about the preparation of which we shall have more to say hereafter. In Europe only French perfumers have manufactured it; according to the author’s experiments, however, its extraction presents no more difficulty than that of any other plant.

A synthetic, chemical product, known as piperonal, related to vanillin and cumarin, possesses the odor of the heliotrope in a most remarkable degree. It is therefore much used to imitate the latter. In commerce it is known as heliotropin.

HONEYSUCKLE.

***Latin*—Flores Loniceræ; *French*—Chèvre-feuille; *German*—- Geisblattblüthen.**

This well-known climbing plant, Lonicera Caprifolium, found in many of our garden bowers, contains an exceedingly fragrant oil in its numerous flowers,

from which the author has prepared it. [Some of the American species of honeysuckle would, no doubt, likewise yield an essential oil.] The oil sold in commerce under this name is not obtained from these flowers, but is an imitation of the odor conventionally accepted for it. The true oil of honeysuckle, first prepared by the author, far surpasses these imitations in fragrance.

Hyssop.

***Latin*—Hyssopus officinalis; *French*—Hyssope; *German*—Ysopkraut.**

Hyssop possesses a strong odor, a very bitter taste, and is used only for cheap perfumery, but more frequently in the manufacture of liqueurs.

Jasmine.

***Latin*—Jasminum odoratissimum; *French*—Jasmin; *German*—Jasminblüthen.**

True jasmine—not to be confounded with German jasmine (Philadelphus coronarius, known here as the mock orange, or the Syringa of cultivation) which is likewise employed in perfumery—flourishes particularly in the coast lands of the Mediterranean, where it is cultivated as a dwarf tree. The odor obtained from the flowers is one of the finest and most expensive in existence, and for this reason it would be well worth trying the cultivation in our southern States. At present nearly all the true jasmine perfume (pomade, extract, etc.) comes from France.

Lavender.

***Latin*—Lavandula vera; *French*—Lavande; *German*—Lavendel.**

True lavender, which belongs to the Order of Labiatæ that contains many aromatic plants, is one of the most ancient in our art; it was early used in Greece for purposes of perfumery. Although true lavender flourishes throughout central Europe, its cultivation on a large scale is carried on chiefly in England, and the oil of lavender from English factories is most highly prized. Much lavender is also grown in France, but the product, though very fine, has a much lower value.

True lavender is to be distinguished from spike-lavender (French, aspic; German, Spik-Lavendel), whose odor is similar to that of true lavender, but furnishes a much less aromatic perfume. The cultivation of lavender in this country (U. S.) might give good results.

Lemon.

***Latin*—Citrus Limonum; *French*—Limon; *German*—Limonenfrüchte.**

The fruits of the South European lemon-tree, not to be confounded with citrons, resemble the latter in appearance, but they are smaller, have a more acid taste and a thinner rind. The peel contains an essential oil which is very similar in odor to that of the citron. Hence the oils of lemon, limetta (from Citrus Limetta), and citron are used for the same purposes; but when the three oils are immediately compared, an experienced olfactory organ perceives a marked difference between them.

Lemon Grass.

***Latin*—Andropogon citrates; *French*—Schoenanthe; *German*—Citronengrass.**

This grass, which bears a close resemblance to citronella, is largely cultivated, especially in India and Ceylon, for the essential oil it contains. The odor of the grass is similar to that of verbena, so that its oil is often used as an adulterant or rather as a substitute for the former. (Compare the article on “Citronella.”)

Lilac.

***Latin*—Flores Syringæ; *French*—Lilas; *German*—Fliederblüthen.**

This plant, Syringa vulgaris, a native of Persia but fully acclimated in Europe and in this country, has very fragrant flowers, the odor of which can be obtained only from the fresh blossoms.

A recently discovered liquid principle, now known as terpineol ($C_{10}H_{17}OH$), which exists in many essential oils, and in these, in the portion boiling between 420° and 424° F., possesses the lilac odor in a most pronounced degree, and to its presence in the lilac flowers the peculiar odor of the latter is, no doubt, due. It is obtainable in the market under the name lilacine.

The Syringa of the florists is not the true lilac, but the same as the Mock Orange, viz., Philadelphus coronarius.

Lily.

***Latin*—Lilium candidum; *French*—Lis; *German*—Lilienblüthen.**

The remarks made under the head of Wallflower apply equally to the blossoms of the white garden lily: strange to say, they are not used in perfumery, and all the so-called odors of lily are mixtures of several aromatic substances. The author has succeeded in separating from the flowers, by means of petroleum ether, the delightful odor present in large amount in the blossoms of this plant, and has employed it in the manufacture of magnificent perfumes.

Mace.

***Latin*—Macis; *French*—Macis; *German*—Muscatblüthe.**

This substance is the dried arillus covering the fruits of Myristica fragrans, the so-called nutmegs. The tree bearing them is indigenous to a group of islands in the Indian Archipelago and is cultivated especially on the Molucca islands. Although mace is in such close relation with nutmeg, yet, strange to say, the aromatic substance differs decidedly from that of the nut. Mace of good quality forms pieces of orange-yellow color; they are fleshy, usually slit open on one side, have a strong odor, tear with difficulty, and are so oily that when crushed they stain the fingers brownish-yellow. Mace is largely used in the preparation of sachets and particularly for scenting soap. In England, soap scented with mace is well liked.

Magnolia.

***Latin*—Magnolia grandiflora; *French*—Magnolia; *German*—Magnoliablüthen.**

The magnolia (Magnolia grandiflora), indigenous to the warmer parts of South, Central, and North America, bears large white flowers having a delightful odor which can be extracted by means of petroleum ether. In the same way, truly intoxicating perfumes may be obtained from other varieties of magnolia. In our climate these plants flourish only in conservatories, and in their home no steps have yet been taken to utilize these natural treasures in a proper way; hence European manufacturers invariably produce the perfume called magnolia by combination of different odors.

Marjoram.

***Latin*—Herba majoranæ; *French*—Marjolaine; *German*—Majorankraut.**

This plant, Origanum Majorana (vulgare), frequently cultivated in kitchen gardens, possesses in all its parts a strong odor due to an essential oil. The latter, which is quite expensive, is but little used, and probably only for culinary purposes.

"Oil of Origanum" in English-speaking countries is intended to mean Oil of Thyme (from Thymus vulgaris), and never means Oil of Marjoram.

Meadow Sweet.

***Latin*—Spiræa ulmaria; *French*—Reine des prés; *German*—Spierstaude.**

This plant is frequent in Europe on damp meadows, and contains an aromatic substance closely allied to oil of wintergreen, which occurs also in the Canadian variety.

Mint.

***Latin*—Mentha; *French*—Menthe; *German*—Minze.**

The varieties of mint claiming our attention are the following: *Mentha piperita*, Peppermint (French: Menthe poivrée; German: Pfefferminze).—*Mentha viridis*, Spearmint (French: Menthe verte; German: Grüne Minze).—*Mentha crispa*, Crisp Mint (French: Menthe crépue [or frisée]; German: Krause Minze).

All of the mints have a pleasant odor; besides the plants named above, we may mention Mentha aquatica, whose odor faintly but distinctly recalls that of

musk. Like lavender, Mentha crispa and M. piperita are cultivated particularly in England, and the English oils are the most superior. Mentha piperita is also largely cultivated in the United States. Mentha viridis and its oil are almost exclusively confined to this country.

Musk-Seed.

***Latin*—Semen Abelmoschi; *French*—Grains d'ambrette; *German*—Bisamkörner.**

The tree, Hibiscus Abelmoschus, indigenous to Africa and India, bears fruit capsules containing reddish-gray seeds with grooved surface, so-called musk-seeds. They have an odor resembling musk, but much weaker, though it becomes more pronounced when the seeds are bruised. Besides this species of Hibiscus, other plants belonging to the same order are aromatic and are also used in perfumery.

Myrrh.

***Latin*—Myrrha; *French*—Myrrhe; *German*—Myrrhe.**

The gum-resin which we call myrrh has long been known in the East, where it was celebrated as one of the finest perfumes, along with spikenard and frankincense. The tree, Balsamodendron Myrrha (or Commiphora Myrrha Engler) is indigenous to the countries bordering the Red Sea to about 22° N. Lat.; the gum exudes partly spontaneously from the trunk. In European commerce myrrh appears in different sorts; that called myrrha electa or myrrha in lacrimis is the most precious; it forms tears of a golden yellow to brown color, traversed by white veins; they have a pleasant smell. That called myrrha naturalis is inferior, but on being heated develops the characteristic aroma. In commerce a product is sometimes offered by the name of myrrh which is nothing but cherry-tree gum scented with genuine myrrh.

Myrtle Leaves.

***Latin*—Myrtus communis; *French*—Myrte; *German*—Myrtenblätter.**

The leaves of this Southern European plant diffuse a pleasant odor; the oil to which it is due can be extracted by distillation; yet the perfumes usually called myrtle are not obtained from the plant, but are made by the combination of several aromatic substances. The aromatic water known, especially in France, as "eau d'anges" is obtained by the distillation of myrtle leaves with water.

Narcissus.

***Latin*—Narcissus poeticus; *French*—Narcisse; *German*—Narcissenblüthen.**

The blossoms of this favorite garden plant, which is cultivated on a large scale near Nice, have a pleasant, almost narcotic odor which may be extracted in various ways; though the greatest part of the so-called narcissus perfumes are made artificially.

Another species of Narcissus (Narcissus Jonquilla) is frequently cultivated in warm countries for its pleasant scent; but the perfumes generally found in the market under the name of Extract, etc., of Jonquil are artificial compounds.

NUTMEG.

***Latin*—Myristica; *French*—Muscade; *German*—Muscatnüsse.**

These nuts are almost spherical in shape, the size of a small walnut, of a grayish-brown color externally, and usually coated with a faint whitish-gray covering (which is lime). Internally they are reddish-brown, with white marbled spots. Good fresh nutmegs should be dense, heavy, and so oily that when pierced with a needle a drop of oil should follow the withdrawal of the latter. Nuts which are hollow, wormy, and of a faint odor cannot be used in perfumery. Oil of nutmeg is used extensively in perfumery, but is rarely employed pure, more commonly in combination with other strong odors.

OLIBANUM.

***Latin*—Olibanum; *French*—Encens; *German*—Weihrauch.**

This gum-resin, employed even by the ancient civilized nations of Asia, especially as incense for religious purposes, comes from East African trees, various species of Boswellia. Fine olibanum appears in light yellow tears, very transparent and hard, whose pleasant though faint odor becomes particularly marked when it is thrown on hot coals. In perfumery olibanum is used almost exclusively for pastils, fumigating powders, etc. Pulverulent olibanum constitutes an inferior quality and is often adulterated with pine resin.

OPOPANAX.

***Latin*—Resina Opopanax.**

The root stock of an umbelliferous plant, indigenous in Syria, now recognized at Balsamodendron Kafal, furnishes a yellow milky sap containing an aromatic resin with an odor resembling that of gum ammoniacum. At least the opopanax now obtainable in the market is derived from this source. True opopanax resin, such as used to reach the market formerly, is now unobtainable, and its true source is yet unknown. Opopanax oil is used in perfumery to some extent.

Orange Flowers.

***Latin*—Flores Aurantii; *French*—Fleurs d'oranges; *German*—Orangenblüthen.**

The flowers of the bitter orange tree (Citrus vulgaris), as well as those of the sweet (Citrus Aurantium), contain very fragrant essential oils, which differ in flavor and value according to their source and mode of preparation. See below, under Oil of Orange. The leaves, too, contain a peculiar oil used in perfumery.

Orange Peel.

***Latin*—Cortex Aurantii; *French*—Ecorce d'oranges; *German*—Orangenschalen.**

The very oily rinds of the orange occur in commerce in a dried form; such peels, however, can be used only in the manufacture of liqueurs; in perfumery nothing but the oil from the fresh rinds is employed, and this is generally obtained by pressure.

Origanum.

See Marjoram, and Thyme.

Orris Root.

***Latin*—Radix Iridis florentinæ; *French*—Iris; *German*—Veilchenwurzel.**

The Florentine sword-lily, Iris florentina, which often grows wild in Italy but is largely cultivated, has a creeping root-stock covered with a brown bark which, however, is peeled from the fresh root. Orris root occurs in commerce in whitish pieces which are sometimes forked; the surface is knotty, and the size may reach the thickness of a thumb and the length of a finger. When fresh, the roots have a disagreeable sharp odor, but on drying they attain an odor which may be said to resemble that of the violet; but on comparing the two odors immediately, a considerable difference is perceptible even to the untrained olfactory sense. Orris root should be as fresh as possible; this may be recognized by its toughness, the great weight, and the white, not yellow color on fracture. It is very frequently used for sachets and for fixing other odors.

Palm Oil.

***Latin*—Oleum Palmæ; *French*—Huile de Palme; *German*—Palmöl.**

Palm oil, a fixed oil derived from Elais guineensis, possesses a peculiar odor faintly recalling that of violets which is easily extracted. Although not used thus far in perfumery, personal experiments have convinced the author that the odor

can be employed in the manufacture of cheap perfumes.

Patchouly.

***Latin*—Pogostemon Patchouly; *French*—Patchouly; *German*—Patschulikraut.**

This herb, indigenous to the East Indies and China, in appearance somewhat resembling our garden sage, is used in the countries named as one of the most common perfumes; many East Indian and Chinese goods (such as Cashmere shawls, India ink, etc.) owe their peculiar odor to the patchouly herb which is very productive. In this respect it can be compared only with the nutmeg, but exceeds even this in intensity. This herb is not known very long in Europe, but at present it is imported in large quantities from India; in commerce it occurs in small bundles consisting of stems and leaves (collected before flowering).

Peru Balsam.

***Latin*—Balsamum peruvianum; *French*—Beaume du Pérou; *German*—Perubalsam.**

This balsam, imported from Central America (San Salvador), is derived from Toluifera Pereiræ; incisions are made in the bark and trunk of the tree, from which the balsam exudes. Peru balsam is of a syrupy consistence, thick and viscid, brownish-red in thin, blackish-brown in thick layers. Its taste is pungent, sharp, and bitter, afterward acrid; its odor is somewhat smoky, but agreeable and balsamic. Peru balsam is often sophisticated with fixed oil; this can be readily detected by agitation with alcohol, by which the oil is separated. But if castor oil is the adulterant, this test is not applicable, as castor oil dissolves with equal facility in alcohol.

Pine-apple.

***Latin*—Bromelia Ananas; *French*—Ananas; *German*—Ananas.**

The fruits of this plant, originally derived from the East Indies, have a well-known narcotic odor which can be extracted from them.

In commerce we often meet with a chemical product called pine-apple ether which will be described at greater length under the head of chemical products used in perfumery. Pine-apple ether has an odor usually considered to be like that of the fruit, but when the two substances are immediately compared a great difference will be detected. Pine-apple ether finds quite extensive application in confectionery for the preparation of lemonades, punch, ices, etc. If the true pine-apple odor is to be prepared from the fruits, care must be had to use ripe fruits; the unripe or overripe fruits possess a less delicate aroma.

Pink.

***Latin*—Dianthus Caryophyllus; *French*—Œillet; *German*—Nelkenblüthen.**

The odor of this favorite garden plant can be easily extracted from the flowers by means of petroleum ether; but the genuine odor of pink is hardly ever met with in perfumery; the preparations sold under this name being usually artificial mixtures of other odors.

Plumeria.

***Latin*—Plumeria; *French*—Plumeria; *German*—Plumeriablüthen.**

All the Plumerias, indigenous to the Antilles, contain very fragrant odors in their flowers. To the best of our knowledge, these odors have not yet been extracted from the flowers, and all the perfumes sold under this name (sometimes also called Frangipanni) are merely combinations of different odors.

Reseda (Mignonette).

***Latin*—Reseda odorata; *French*—Mignonette; *German*—Reseda.**

This herbaceous plant, probably indigenous to northern Africa, but long domesticated in Europe and cultivated in gardens, is well known for its refreshing odor. The latter, however, is very difficult to extract and is yielded only to the method of absorption (enfleurage). The true odor of reseda, owing to the mode of its preparation, is very expensive, and for this reason nearly all perfumes sold under this name are produced from other aromatic substances.

Rhodium.

***Latin*—Lignum Rhodii; *French*—Bois de rose; *German*—Rosenholz.**

This is derived from two climbing plants, Convolvulus scoparius and Convolvulus floridus, indigenous to the Canary islands, and is the root wood of these plants. Its odor resembles that of the rose, and the wood is frequently used for cheap sachets and for the extraction of the contained essential oil which was formerly (before oil of rose geranium was made on the large scale) employed for the adulteration of genuine oil of rose.

Rose.

***Latin*—Rosa; *French*—Rose; *German*—Rosenblüthen.**

Horticulture has produced innumerable varieties from wild species of roses, which differ in size, form, color, as well as in odor. We instance here only the

various odors exhaled by tea roses and moss roses. Accordingly, perfumers likewise distinguish different odors of roses. Cultivated on a large scale exclusively for the extraction of the essential oil, we find different varieties of roses in India, in European Turkey (Rosa Damascena), in Persia, and in Southern France. In this country (U. S.), too, oil of roses could be manufactured with advantage.

The wild rose, sweet brier, French églantine, possesses a delicate but very fugitive odor, and therefore the perfume sold as wild rose is usually prepared from other substances with the addition of oil of roses. The same remark applies to the odor called “white rose” and to those sold as “tea rose,” “moss rose,” etc.

Rosemary.

***Latin*—Rosmarinus officinalis; *French*—Romarin; *German*—Rosmarin.**

This plant, indigenous to Southern and Central Europe, contains pretty large quantities of an aromatic oil in its leaves and flowers; the oil has a refreshing odor and therefore is frequently added in small amounts to fine perfumes.

Rue.

***Latin*—Ruta graveolens; *French*—Rue; *German*—Raute.**

This plant, cultivated in our gardens and also growing wild here, has long been employed for its strong odor; in perfumery rue, in a dry state as well as its oil, is occasionally used.

Sage.

***Latin*—Salvia officinalis; *French*—Sauge; *German*—Salbei.**

All varieties of sage, the one named being found most frequently growing wild in the meadows of Southern Europe, and extensively cultivated in Europe and in this country, possess a very agreeable, refreshing odor which adheres for a long time even to the dried leaves; these are therefore very suitable for sachets, tooth powders, etc.

Santal Wood.

***Latin*—Santalum album; *French*—Santal; *German*—Santalholz.**

The tree from which this wood is derived is indigenous to Eastern Asia, to the Sunda Islands. The wood is soft, very fragrant, and is also erroneously called sandal wood. The latter is of a dark reddish-brown color, not fragrant, and is

derived from Pterocarpus santalinus, a tree indigenous to Southern India, and the Philippine Islands; it is of value to the dyer and the cabinet-maker, but to the perfumer only for coloring some tinctures. For the purposes of perfumery use can be made only of santal wood (white or yellow santal wood) which possesses a very pleasant odor resembling that of oil of rose. Formerly essential oil of santal was employed for the adulteration of oil of rose. White and yellow santal wood comes from the same tree—the former from the smaller trunks of Santalum album.

Sassafras.

***Latin*—Lignum Sassafras; *French*—Sassafras; *German*—Sassafrasholz.**

Sassafras wood, derived from the root of the American tree Sassafras officinalis, appears in commerce in large bundles. It has a strong peculiar odor; in the bark of the root the odor is even more marked. In the European drug trade Sassafras saw dust is also met with, but this is not rarely mixed with pine saw dust which has been moistened with fennel water and again dried. In perfumery sassafras wood is less used for the manufacture of volatile odors than for scenting soap. Since the principal constituent of oil of sassafras, viz., safrol, has been found to be contained in the crude oil of Japanese camphor, the latter has to a very large extent taken the place of the natural oil.

Spikenard.

***Latin*—Nardostachys Jatamansi; *French*—Spic-nard; *German*—Nardenkraut.**

This plant, belonging to the Order of Valerianaceæ, which generally possess a strong and more or less unpleasant odor, forms one of the main objects of Oriental perfumery; in the East Indies, where the plant grows wild on the mountains, the odor is held about in the same estimation as that of roses, violets, etc., in Europe. Spikenard was probably known to the ancient Babylonians and Assyrians, for in the Bible, in the Song of Solomon, we find this plant repeatedly mentioned and praised for its pleasant odor. As the odor of spikenard is not appreciated in Europe, the plant is rarely met with in commerce. All parts of the plant are aromatic, but use is chiefly made of the root, consisting of fine fibres which are tied in bundles the thickness of a finger.

Star-Anise.

***Latin*—Illicium; Semen Anisi stellati; *French*—Badiane; *German*—Sternanis.**

Star-anise occurs in commerce in the form of eight-chambered capsules, each

compartment containing one glossy seed, and is derived from a Chinese tree, Illicium anisatum. The fruits are brown, woody; the seed has a sweetish taste and an odor resembling that of anise. Outside of perfumery star-anise is used in the manufacture of liqueurs. Recently a drug has appeared in commerce under the name of star-anise which possesses poisonous qualities, and is derived from another variety of Illicium (Illicium religiosum). While this may be of no consequence to the perfumer, it is important to the manufacturer of liqueurs who always uses star-anise for fine goods and never oil of anise.

Storax.

***Latin*—Styrax; *French*—Styrax; *German*—Storax.**

This product which belongs among the balsams is derived from a small tree, Liquidambar orientalis, and is obtained from the bark by heating with water, and also by pressure. It forms a viscid mass like turpentine, has a gray color, a burning sharp taste, an agreeable odor, and is easily soluble in strong alcohol; but the odor becomes pleasant only after the solution is highly diluted. Storax has the peculiar property of binding different, very delicate odors, to render them less fugitive, and for this reason finds frequent application in perfumery.

Oriental storax should not be confounded with American storax which occurs in commerce under the name of Sweet Gum, Gum Wax, or Liquidamber, and is derived from Liquidambar styraciflua. It is quite a thick transparent liquid, light yellow, gradually becoming more and more solid and darker colored, but is often used in place of the former, though its odor is less fine.

Sumbul Root.

***Latin*—Radix Sumbul; *French*—Soumboul; *German*—Moschuswurzel.**

The Sumbul plant (Ferula Sumbul), indigenous to Turkestan and adjoining countries, has a light brown root covered with thin fibres, which has a penetrating odor of musk. Owing to this quality it is frequently employed in perfumery, especially for sachets. In commerce a distinction is made between East Indian and Bokharian or Russian sumbul, due to the different routes by which the article arrives. The latter, which possesses the strongest odor, probably because it reaches the market in a fresher state, is the most valuable.

Sweet Almonds.

***Latin*—Amygdala dulcis; *French*—Amandes douces; *German*—Süsse Mandeln.**

The almond-tree, Amygdalus communis, occurs in two varieties,

undistinguishable by botanical characteristics. One bears sweet, the other bitter fruits (comp. Bitter almonds, page 24). Both are odorless and contain much fixed oil. The special odor of bitter almonds forms only in consequence of the decomposition of a peculiar body (amygdalin), present in bitter almonds, when it comes in contact with water. Good almonds are full, juicy, light brown, without wrinkles, and have a sweet mild taste. A rancid taste characterizes staleness. The fixed or expressed oil, both that of the sweet and that of the bitter almonds (which are identical in taste, odor, and other properties), is used in perfumery for fine hair oils, ointments, and some fine soft soaps.

SWEET-FLAG ROOT.

***Latin*—Radix Calami; *French*—Racine de glaïeule; *German*—Calmuswurzel.**

The calamus root met with in commerce is the creeping root-stock of a plant (Acorus Calamus), occurring in all countries of the northern hemisphere, and frequent in European and American swamps. The root-stock is spongy, about as thick as a finger, many-jointed, and of a yellowish color, with many dark streaks and dots. Inside the color is reddish-white. The odor is strong and the taste sharp and burning.

SWEET-PEA.

***Latin*—Lathyrus tuberosus; *French*—Pois de senteur; *German*—Platterbsenblüthen.**

Sweet-pea flowers, which have a very delicate odor, yield it to the usual solvents. The odor bears some resemblance to that of orange flowers, but is rarely used alone; it is generally combined with others to make it more lasting.

SYRINGA.

***Latin*—Philadelphus coronarius; *French*—Seringat, Lilac; *German*—Pfeifenstrauchblüthen.**

The white flowers of this garden bush have a very pleasant odor which resembles that of orange flowers, in place of which it can be used, in the cheaper grades of perfumery. This plant which flourishes freely in our climate deserves more attention by perfumers than it has hitherto received, since it appears to furnish an excellent substitute for the expensive oil of orange flowers, as above stated, in cheap perfumes.

THYME.

***Latin*—Thymus Serpyllum; *French*—Thym; *German*—Thymian.**

This well-known aromatic plant, which grows most luxuriantly on a

calcareous soil, has an odor which is not unpleasant but is in greater demand for liqueurs than for perfumes. Here and there, however, it is employed for scenting soap. Common thyme, Thymus vulgaris, is used for the same purposes.

Under the name of Oil of Thyme, in the English and American market, is generally understood the oil of Thymus vulgaris, which is largely distilled in the South of France. This oil is commonly misnamed Oil of Origanum.

Tolu Balsam.

***Latin*—Balsamum tolutanum; *French*—Beaume de Tolu; *German*—Tolubalsam.**

This balsam is derived from a tree indigenous to the northern portion of South America, Toluifera Balsamum, belonging to the Order of Leguminosæ. The balsam, which is obtained by incisions into the bark of these trees, is at first fluid, but becomes firm in the air owing to rapid resinification; in commerce it appears in a viscid form ranging from that of Venice turpentine to that of colophony. Its color varies from honey-yellow to reddish-brown; the taste is at first sweet, then sharp, it softens under the heat of the hand, and when warmed or sprinkled in powder form on glowing coals it diffuses a very pleasant odor recalling that of Peru balsam or vanilla. It shares with storax and Peru balsam the valuable property of fixing volatile odors and is often employed for this purpose, but is also frequently used alone in fumigating powders, tooth powders, etc. Adulteration of Tolu balsam with Venice turpentine or colophony is not rarely met with.

Tonka Beans.

***Latin*—Fabæ Tonkæ; *French*—Fèves de Tonka; *German*—Tonkabohnen, Tonkasamen.**

The South American tonka tree, Dipteryx odorata, bears almond-shaped drupes almost as long as the finger, which contain seeds two to four centimetres in length, the so-called tonka beans. These occur in European commerce in two sorts, the so-called Dutch and English tonka beans; the former are large, full, covered externally with a folded brown to black skin, and white inside. The latter are barely two-thirds the size of the former, almost black, and less glossy. The odor of the tonka bean is due to a volatile crystalline substance, coumarin, which often lies on the surface and in the wrinkles of the bean in the form of delicate, brilliant crystalline needles. Coumarin exists also in many other plants, for instance, in sweet woodruff (Asperula odorata), deer-tongue (Liatris odoratissima), etc.

TUBEROSE.

***Latin*—Polianthus tuberosa; *French*—Tubérose; *German*—Tuberose.**

This beautiful and very fragrant plant is frequently cultivated in Southern France; its pleasant odor, however, owing to its great volatility, can never be used pure, but must always be fixed with one of the above-mentioned balsams. As has been stated in connection with several aromatic plants, tuberose could be grown in our southern States with advantage for the extraction of its odor.

VANILLA.

***Latin*—Vanilla aromatica, Vanilla planifolia; *French*—Vanille; *German*—Vanille.**

The vanilla, which may justly be called a king among aromatic plants, is a climbing orchid indigenous to tropical America. It is cultivated on a most extensive scale on the islands of Reunion and Mauritius; largely also in Mexico, and in some other countries. The agreeable odor is present in the fruit. These form three-lobed capsules about the length of a lead pencil and the thickness of a quill. Externally they are glossy brown, have a fatty feel, and show in the depression a white powder which appears crystalline under a lens. Internally good fresh vanilla is so oily that it stains the fingers on being crushed and is filled with numerous shining seeds the size of a small pin's head. These properties, together with the plump appearance and great weight, mark good qualities. Old vanilla, whose odor is fainter and less fragrant, may be recognized by its wrinkled surface, the absence of the white dust, the slight weight, and the bent ends of the capsules. Fraudulent dealers endeavor to give such old goods a fresher appearance by coating them with almond oil or Peru balsam. "Vanilla de Leg" is recognized as the first quality of Mexican vanilla. Like most odors, that of vanilla does not become pleasant until it is sufficiently diluted.

VERBENA.

***Latin*—Verbena triphylla, Aloysia citriodora; *French*—Verveine; *German*—Verbenakraut.**

The leaves of this Peruvian plant, especially on being rubbed between the fingers, exhale a very pleasant odor which is due to an essential oil. The odor resembles that of fine citrons, or rather that of lemon grass; hence these two odors are frequently mistaken for each other. Owing to the high price of true oil of verbena, all the perfumes sold under this name are prepared from oil of lemon grass (see under Citronella) and other essential oils.

VETIVER.

***Latin*—Andropogon muricatus; *French*—Vétyver; *German*—Vetiverwurzel.**

Vetiver, also called cuscus, and sometimes iwarankusa (though this is more properly the name of Andropogon lanifer; see above, under Citronella), is the fibrous root-stock of a grass indigenous to India, where fragrant mats are woven from it. The odor of the root somewhat resembles that of santal wood, and is used partly alone, partly for fixing volatile perfumes. Shavings of the root are frequently employed for filling sachet bags.

VIOLET.

***Latin*—Viola odorata; *French*—Violette; *German*—Veilchenblüthen.**

The wonderful fragrance of the March violet is due to an essential oil which it is, however, difficult to extract. For this reason genuine perfume of violets, really prepared from the flowers, is among the most expensive odors, and the high-priced so-called violet perfumes are generally mixtures of other fine odors, while the cheaper grades are made from orris root.

VOLKAMERIA.

This plant, Volkameria inermis, often cultivated in conservatories, has a very agreeable odor. The perfume called by this name, however, is not obtained from the plant, but is produced by the mixture of several aromatic extracts from other plants.

WALLFLOWER.

***Latin*—Cheiranthus Cheiri; *French*—Giroflé; *German*—Levkojenblüthen, Goldlack.**

The wallflower, a well-known biennial garden plant belonging to the Order of Cruciferæ, according to recent experiments yields a very fine odor to certain substances and may be employed in the manufacture of quite superior perfumes. The preparations usually sold as wallflower, however, are not made from the flowers of this plant, but are mixtures of different odors.

WINTERGREEN.

***Latin*—Gaultheria procumbens; *French*—Gaulthérie; *German*—Wintergrünblätter.**

This herbaceous plant, indigenous to North America, especially Canada and the Northern and Middle United States, where it grows wild in large quantities, has a very pleasant odor due to an essential oil and a compound ether which can also be produced artificially. The odor of wintergreen serves chiefly for scenting

fine soaps.

Ylang-Ylang.

This plant, Unona odoratissima, indigenous to the Philippine Islands, contains an exceedingly fragrant oil. It is brought into commerce from Manilla.

Owing to climatic relations, it is impossible for the perfumer to procure all the above-enumerated substances in the fresh state; many of them he is forced to purchase through the drug trade, and he should bear in mind to give the preference always to the freshest obtainable goods. At times it is not possible to utilize the materials at once for the extraction of the odors and they must be kept for some time. The vegetable substances should always be stored in an airy, not over dry room; and the material should be often inspected. If a trace of mouldiness shows itself, the material must be worked at once, since, if the mould is allowed to go on, the fragrance will suffer and may be destroyed altogether.

The aromatic substances here enumerated are those which have actually found general employment in perfumery; but the list is not complete, since every aromatic plant can be used for the extraction of its odor. Of course, this is connected with some difficulties, but even in the present state of our knowledge they can all be overcome. When a new odor has been prepared, the art of the perfumer consists in ascertaining by many experiments those substances which harmonize with it; for with few exceptions the finest grades of perfumes are not single odors but combinations of several which are in accord.

Even among our domestic plants there are numerous finds to be made by the perfumer, and in this respect we refer particularly to some very fragrant kinds of orchids in our woods and to the delightful odor of the lily of the valley. As to the latter, a perfume is met with in commerce under this name, but its odor bears no resemblance to that of the flower.

A few facts appear to us of especial importance. In practical perfumery many of the plants which are easily obtainable in large quantities, such as the flowers of clover and trefoil, the primrose, the rock-rose (Daphne Cneorum), dame’s-violet (Hesperis matronalis), and others above named, have never been employed. As an actual curiosity we may state that there is thus far no perfume containing the delightful odor present in the flowers of the linden-tree, of the Robinia (erroneously called Acacia), of the lilac, etc., at least not made from the

plants here named.

CHAPTER V.
THE ANIMAL SUBSTANCES USED IN PERFUMERY.

While the vegetable kingdom offers us an abundance of aromatic odors the end of which it is impossible to foresee, the animal kingdom contains absolutely no substance which may be called sweet-scented in the strict sense of the term. If we find nevertheless a few animal substances generally used in perfumery, they should be considered rather as excellent means for fixing subtle vegetable odors than as fragrant bodies in the true sense. By themselves, indeed, they have an odor, but to most persons it is not agreeable even if properly diluted. Thus far only five substances of animal origin are employed in perfumery, namely: ambergris, castor, hyraceum, musk, and civet.

AMBERGRIS.
***Latin*—Ambra grisea; *French*—Ambregris; *German*—Ambra.**

This is a substance whose origin is still doubtful; many facts indicate that it is a secretion—whether normal or morbid may be left undecided—of the largest living mammal, namely, of the pot-whale (Physeter macrocephalus). Ambergris is found in the intestines of this animal or, more frequently, floating about in the sea; the shores of the continents bordering the Indian Ocean furnish the largest amount of this peculiar substance.

Ambergris is a grayish-white fatty substance which occurs in commerce in pieces of various sizes—those as large as a fist are rare—of a penetrating, decidedly disagreeable odor. It is soluble in alcohol, and when properly diluted the odor becomes pleasant and it is so permanent that a piece of linen moistened with it smells of it even after being washed with soap. By itself, ambergris is not much used; it finds its chief application in combination with other odors or as an addition to some perfumes in order to make them lasting.

CASTOR.
***Latin*—Castoreum; *French*—Castoreum; *German*—Castoreum.**

This is a secretion of the beaver (Castor fiber); it accumulates in two pear-shaped bags on the abdomen of the animal, both male and female. The hunters remove these bags from the body of the dead animal and in this form they are brought into commerce. These sacs are the length of a finger, at the thickest

point the diameter of a thumb, and contain a greasy mass of yellowish-brown, reddish-brown, or blackish color, according to the nourishment of the animal. This mass constitutes castor; it has a strong, disagreeable odor, a bitter, balsamic taste, becomes soft when heated, is combustible, and almost entirely soluble in alcohol. It is probable that this secretion in its composition has some relation to the nourishment of the beavers which feed by preference on resinous vegetable substances. In commerce Canadian and Siberian castor are distinguished; the latter is more valuable and has almost disappeared from the market. It possesses a peculiar tarry, Russian-leather odor, probably due to a substance present in birch bark, upon which the Siberian animals feed almost exclusively. Canadian castor has an odor more nearly resembling pine resin. In perfumery castor is rarely used, usually only for fixing other odors.

Hyraceum.

The substance occurring in commerce under this name, the excrement of an animal found in Capeland, the rock badger or rock rabbit (Hyrax capensis), is very similar in its properties to castor, and according to comparative experiments made by us can be used in place of the latter.

Musk.

***Latin*—Moschus; *French*—Musc; *German*—Moschus.**

Of animal substances, musk is most frequently used in perfumery, and possesses the most agreeable odor of them all. Moreover, the odor of musk is the most intense that we know, actually imponderable quantities of it being sufficient to impart to a large body of air the strong odor of musk. This substance is derived from a deer which attains the size of a small goat and, like the chamois of the Alps, lives on the highest mountains of the Himalayas. Only the male animal (Moschus moschiferus) produces musk, which is secreted in a sac or rather gland near the sexual organ. Musk being subject to the worst adulterations owing to its high price, we append a description of the substance as well as of the sac or bag in which it appears in commerce.

The musk bag cut by the hunter from the body of the animal has the size and shape of half a walnut. On the side by which it was attached to the body of the animal it is membranous and nearly smooth; on the external surface it is more or less hemispherical and covered with light brown or dark brown hair, according to the season at which the animal was killed. The hair assumes a circular arrangement around an opening situated in the centre of the bag. This opening,

the efferent duct of the gland, is formed by a ring-shaped muscle which yields to the pressure of a pointed object and permits the introduction of the point of the finger. Internally the musk bag consists of several layers of membrane which surround the musk itself. It is probable that the musk is secreted by these membranes, for when the animal is dissected, no direct communication of the musk gland with the body can be detected.

It has been surmised that the secretion of musk bears some relation to the food; at least it has been asserted that the animals eat, among other things, sumbul root with great avidity; and this root, it will be remembered, has a very intense odor of musk. However, though this appears probable at first sight, it is contradicted by the fact that the females and the young males likewise eat the root without manifesting any odor of musk nor do they secrete the substance, while the older males produce it even when they are fed with hay only. Another fact is of interest, namely, that other ruminants, too, for instance, cattle, diffuse a marked though faint odor of musk which occurs also in their excrements, exactly as in the case of the musk deer. Alligators likewise produce a musk-like substance which has actually been made use of in place of musk for coarser purposes.

The musk present in the glands differs in appearance with the season and the age of the animal. Musk deers killed in spring have in their musk bag an unctuous soft mass of a reddish-brown color with the strongest odor; at other seasons the mass is darker in color, almost black, and granular; the size of the grains ranges from that of a millet-seed to that of a large pea.

That the secretion of musk belongs to the sexual functions appears probable from the fact that it can be found only in the bags of males more than two years old; that of younger animals contains only a substance of a milky consistence, whose odor has no resemblance to that of musk. The quantity of musk present in a bag varies with the season and the age of the animal; the smallest quantity may be assumed at about six drachms, though some bags contain as much as one and a half ounces.

The hunters dry the bags either on hot stones or in the air, or they dip them into hot oil. In commerce musk occurs either in bags under the name moschus in vesicis, “musk in pods,” or free, moschus in granis, moschus ex vesicis, “grain musk.” According to its origin four sorts are distinguished: Chinese or Tonquin musk, Siberian or Russian musk, Assam or Bengal musk, and finally Bokharian musk. The latter two varieties, however, rarely reach this market. Chinese musk

(Tonquin or Thibet musk) occurs in small boxes containing twenty to thirty bags, each wrapped in Chinese tissue paper; on which Chinese characters are printed. This is considered the best quality. Assam musk occurs in boxes lined with tin which contain as many as two hundred or more bags; its value is about two-thirds that of the former. Russian musk is packed in various ways and is worth about one-fourth that of the Chinese; a special variety of it, of a weaker and rather urinous odor, is known as Cabardine musk; of least value is Bokharian musk which is of a grayish black color, with a faint odor.

Musk is adulterated in an almost incredible manner; at times so-called musk bags are met with which are artificially constructed of animal membranes and filled with dried blood, earth, etc., and slightly scented with genuine musk. But even the genuine musk bags are often tampered with; musk being removed from the opening and the space filled with earth, dried blood, animal excrement, or perhaps pieces of copper and lead.

Pure musk reacts quite characteristically toward caustic alkalies such as caustic potash and soda or solution of ammonia, and these substances are used for testing the purity of musk. If a dilute alkaline solution is poured over musk, a marked increase of the odor is observed after a short time; if the alkaline solution is concentrated or hot, the odor of musk disappears completely and the fluid develops the caustic odor of pure ammonia. Hot water dissolves about eighty per cent of the total weight of musk; strong alcohol dissolves about one-tenth of it; when heated in an open porcelain capsule, musk burns with a disgusting empyreumatic odor and leaves a considerable amount of ash, about one-tenth of its weight. Besides the above-named substances which destroy the musk odor by the decomposition of the aromatic constituent, there are other bodies, whose action we do not know at present, which have the peculiar property of completely extinguishing this most penetrating of all odors: to deodorize a vessel completely which has contained musk, it is sufficient to rub in it some bitter almonds moistened with water or some camphor with alcohol.

In an extremely dilute condition musk is used for perfuming the finest soaps and sachets, and even in the manufacture of the most expensive and best perfumes, owing to its property of imparting permanence to very volatile odors. In the last-mentioned class, however, the quantity of musk must always be so small that its presence is not distinctly observed, since many persons find the pure odor of musk very disagreeable, while they praise the fragrance of such perfumes as contain an amount of this substance too small to be perceived by the olfactory nerves.

CIVET.

***Latin*—Civetta; *French*—Civette; *German*—Zibeth.**

This substance bears some resemblance to musk with reference to its derivation and the rôle it plays in the life of the animal from which it is obtained. The Viverridæ, a class of carnivora related to the cats and weasels, found in Asia and Africa, furnish this substance. It is obtained chiefly from the civet cat (Viverra Civetta) and the musk rat (Viverra Zibetha) which are kept in captivity for the purpose of abstracting from them from time to time the civet which is always formed anew.

Civet is the secretion of a double gland present both in the male and the female near the sexual organs. Fresh civet is a whitish-yellow mass of the consistence of butter or fat, and becomes thicker and darker on exposure to the air. Similar to musk, it has a strong odor which becomes pleasant on being diluted and is used both alone and for fixing other odors.

CHAPTER VI.
THE CHEMICAL PRODUCTS USED IN PERFUMERY.

In the manufacture of perfumery a considerable number of chemical products find application; in this place, however, we shall describe only those which are used very frequently and generally, and discuss the characteristics of those employed more rarely in connection with the articles of perfumery into which they enter. According to their application we may divide these substances into several groups, namely:

A. Chemicals which, without themselves serving as perfumes, are used exclusively for the extraction of odors.

B. Chemicals which, while not fragrant, are frequently employed in the preparation of perfumes. Under this head we have included also those substances which are not strictly chemical products, but originally come from the animal or vegetable kingdom, such as fats, spermaceti, and wax, yet cannot be used in perfumery unless they have undergone a process of chemical purification.

C. Chemical products used for coloring perfumes, so-called dye-stuffs.

The greater portion of the substances to be here described it will hardly be the province of the perfumer to prepare himself, as they are furnished by chemical factories at low prices; but some of them—for instance, sublimed, natural benzoic acid suitable for perfumery and a few other substances—the perfumer should make himself, in order to be sure of its genuineness. Therefore, while in the former class it will be sufficient to describe their properties to enable the manufacturer to distinguish good quality from bad, the latter class must be discussed at greater length.

A. Chemicals used for the Extraction of Aromatic Substances.

For the extraction of aromatic substances from plants a number of bodies are used which possess great solvent power for essential oils, and are besides very volatile, or have a low boiling-point. These are particularly ether, chloroform, petroleum ether, and bisulphide of carbon.

Ether.

This liquid, in commerce also called sulphuric ether, is made in large quantities in chemical laboratories by the distillation of alcohol with sulphuric acid, followed by a second distillation or rectification. When pure, ether forms a mobile, thin, strong-smelling, and inflammable liquid which when inhaled produces insensibility, for which reason it is used as an anæsthetic in surgery. Its specific gravity is about 0.720 when anhydrous, and its boiling-point 35° C. (95° F.). It forms an excellent solvent for essential oils, resins, fats, and similar bodies. Owing to its great volatility, its vapors are quickly diffused in the air, and, as they are very inflammable, lights must be kept away from a bottle containing this substance. The same remark applies to most of the substances to be presently described.

Chloroform.

is prepared by the distillation of chlorinated lime, alcohol, and water, acetone being more recently substituted for the alcohol, followed by rectification of the product. When inhaled it produces insensibility like ether. It has a pleasant odor and sweet taste. Its specific gravity is about 1.49 and its boiling-point 61° C. (142° F.). Owing to its great solvent power and low boiling-point, chloroform is largely used for the extraction of aromatic vegetable substances; it does not take fire directly in the air.

Petroleum Ether.

Petroleum, which is brought into commerce in immense quantities, especially from Pennsylvania, for illuminating purposes, cannot be used in its crude state, but requires rectification. Petroleum as it issues from the earth consists of various hydrocarbons mixed together, some of which have very low boiling-points, so that their vapors readily take fire and would make the use of petroleum in lamps dangerous. Petroleum, therefore, is heated in large apparatuses to about 70 or 80° C. (158 to 176° F.), when the more volatile products pass over, and the petroleum for illuminating purposes remains in the stills. A certain fraction of the volatile distillate, the so-called petroleum ether, is largely used in the manufacture of varnishes. Owing to its great solvent power for aromatic vegetable substances and its low price, petroleum ether has become quite an important body for the extraction of perfumes, which will be further discussed hereafter. Good petroleum ether is colorless, has a peculiar, not unpleasant odor and a boiling-point between 50 and 55° C. (112° and 131° F.).

Benzin.

is a common name for another fraction of the volatile distillate from petroleum, viz., that which boils between 50° and 60°C. (122° to 140° F.) and has a spec. grav. of 0.670 to 0.675°.

This liquid, which is also used as a volatile solvent for the extraction of odorous substances, must not be confounded with Benzene or Benzol, a distillate from coal tar, boiling at about 80° C. (176° F.) and having a spec. grav. of 0.878. The latter is not used for the extraction of perfumes.

Bisulphide of Carbon.

This is made by conducting vapors of sulphur over glowing charcoal or coke. The vapors of bisulphide of carbon thus formed are led into vessels filled with ice or ice-cold water, where they condense. Bisulphide of carbon is a colorless liquid, heavier than water and very refractive. It is inflammable, and possesses a peculiar odor which is not disagreeable if the liquid has been thoroughly purified. Its boiling-point is about 45° C. (113° F.) and it has great solvent power. At the present time, the market affords bisulphide of carbon of a high degree of purity.

Some manufacturers who prepare their odors by extraction, may find it advantageous to make also the bisulphide of carbon necessary for it, and this is best done in Gérard’s apparatus (Fig. 1). It consists of a cast-iron cylinder *a*, two metres high and one metre in diameter. This cylinder is heated on the outer surface in an oven, and two tubes, *c* and *d*, are attached to it. Tube *d* is connected by *e* with the hemispherical vessel *b* which is connected by the tube *i* with the condenser *mlk*. The condenser is formed of three cylinders made of sheet zinc which are surrounded with cold water. The condensed liquid escapes into the vessel *p*, while the gaseous products pass through *n* into the chimney. The cylinder *a* is filled with about 1,500 pounds of charcoal or coke in small pieces, after which it is closed and all tubes are carefully luted with clay; *a* is then heated to a strong red heat and at intervals of three minutes 3 pounds of sulphur are thrown in through *c*. In twenty-four hours, by the use of 478 pounds of sulphur, 568 pounds of crude bisulphide of carbon are obtained; a portion of the sulphur distils over uncombined into the vessel *b*.

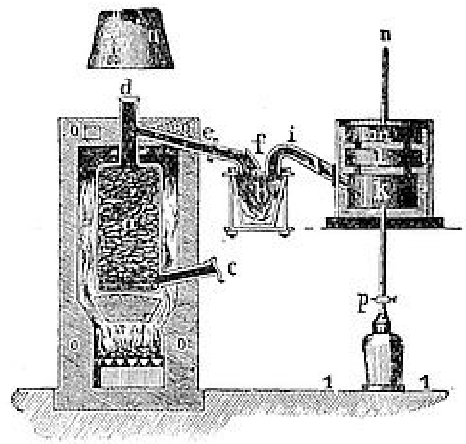

Fig. 1.

The crude bisulphide of carbon contains about twelve per cent of sulphur and other combinations in solution and is redistilled at exactly 48° C. (118.4° F.) in a steam-heated apparatus with a long exit tube cooled with ice below and water above. In order to obtain the bisulphide of carbon absolutely pure, which is essential to render it suitable for extraction, it is again distilled at the same temperature, with the addition of two per cent of palm oil. As the vapors of bisulphide of carbon are injurious to the organism, the vessels containing it must always be kept well closed.

B. Chemical Products used for the Preparation of Perfumes.

Among all the substances belonging under this head, there is one which plays a prominent part in the manufacture of most perfumes. In handkerchief perfumes it is one of the most important substances, as it forms not only the greatest bulk, but the perfection of the perfume depends upon its quality. This substance is—

Alcohol,

also called spirit of wine; French, esprit de vin; the well-known combustible liquid formed by the alcoholic fermentation of sugar, which is made on a large scale in extensive distilleries. Alcohol is a thin, mobile liquid with an aromatic odor. The usual "strong" alcohol of the market contains about ninety-four per cent of absolute alcohol by volume. This has a specific gravity of 0·820. Its boiling-point is 78·2° C. (172·40 F.), and it congeals at a very low temperature, below -100° C. Alcohol possesses great solvent power for resins, balsams, and essential oils.

These properties, however, belong only to the commercial stronger or so-called “druggists’ alcohol,” and more particularly to a very pure quality of it, as free as possible from fusel-oil compounds, known as cologne spirit. As absolute alcohol is also necessary for the purposes of perfumery, we shall briefly describe its preparation.

In order to make absolute alcohol, sulphate of copper is heated in a retort until it has changed into a white powder. After the powder has cooled in the covered retort, it is at once introduced into a large glass bottle; over it is poured the strongest obtainable alcohol (96% Tralles) which must be free from fusel oil; then the bottle is closed air-tight and repeatedly shaken. The sulphate of copper which has lost its water of crystallization by the heat reabsorbs it from the alcohol and again becomes blue and crystalline. Generally four pounds of sulphate of copper are used for ten quarts of alcohol; when white burnt sulphate of copper after long contact with alcohol still remains white, the alcohol is proved to be practically anhydrous (it may still contain about two per cent of water).

Larger quantities of absolute alcohol are made in a copper still containing fused anhydrous chloride of calcium in small pieces. The apparatus is closed and alcohol of 94 to 95% is poured in through a tubulure. The mixture often grows so warm that the alcohol begins to pass over, so that but little heat need be applied to make the absolute alcohol distil over.

Absolute alcohol obtained in this way—for by repeated distillation we get at most an alcohol of 96%—abstracts water from the air with avidity; hence it must be preserved in air-tight vessels which should contain a small amount of anhydrous sulphate of copper.

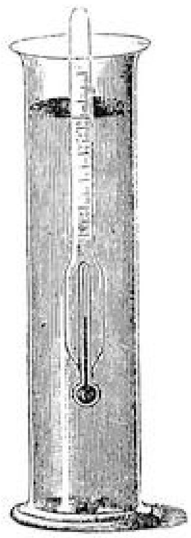

Fig. 2.

Strong commercial alcohol contains varying amounts of water—from four to twenty parts by volume (96 to 80% alcohol); at the present time, however, it is always customary for dealers in this country to supply the officinal alcohol of 94%, when "strong alcohol" is called for. Its strength is measured by an areometer which sinks in proportion to the purity of the alcohol; the alcoholometer of Tralles or volumeter shows at once on its scale how many parts by volume of absolute alcohol (volume per cent) are contained in 100 volumes of alcohol. The adjoining figure (Fig. 2) shows Tralles' alcoholometer, with the vessel in which the test is made. The readings of the instrument, however, are correct only at a temperature of 15·6° C. (60° F.), the so-called normal temperature; at a higher or lower point they must be corrected according to the tables appended.

At temperatures below the normal, the amount of alcohol is greater than the areometer indicates, hence a percentage must be added; at higher temperatures a percentage must be deducted.

Tables for Finding the True Percentage by Volume, at the Normal Temperature of 60° F., of Alcohol of Any Strength, when Tested at Temperatures Below or Above 60° F.

Table I.—For Temperatures Under 60° F.

Per cent of Alcohol	Number of F. Degrees Requiring	Per cent of Alcohol	Number of F. Degrees Requiring

by Volume.	Addition of one to Percentage.	by Volume.	Addition of one to Percentage.
21	5·4	60	5·4
22	5·175	61	5·4
23	4·725	62	5·4
24	4·5	63	5·625
25	4·5	64	5·625
26	4·5	65	5·625
27	4·5	66	5·625
28	4·275	67	5·625
29	4·275	68	5·85
30	4·275	69	5·85
31	4·275	70	5·85
32	4·275	71	5·85
33	4·275	72	5·85
34	4·275	73	5·85
35	4·5	74	6·075
36	4·5	75	6·075
37	4·5	76	6·075
38	4·5	77	6·075
39	4·5	78	6·3
40	4·5	79	6·3
41	4·725	80	6·3
42	4·725	81	6·525
43	4·725	82	6·525
44	4·725	83	6·75
45	4·95	84	6·75
46	4·95	85	6·75
47	4·95	86	6·75
48	4·95	87	6·975

49	4·95	88	7·2
50	5·175	89	7·425
51	5·175	90	7·65
52	5·175	91	7·875
53	5·175	92	8·1
54	5·175	93	8·325
55	5·175	94	8·775
56	5·175	95	9·
57	5·4	96	9·45
58	5·4	97	10·125
59	5·4		

EXPLANATION.—Supposing an alcohol should be found to contain 40 per cent of absolute alcohol by Tralles' alcoholometer at 45° F. The difference between 45 and 60° F. is 15. Opposite to 40 will be found the figure 4·5. For every 4·5 degrees F. below 60° there must be added 1 to the alcoholic percentage. Hence for 15 degrees there must be added 3.3 degrees. The alcoholic percentage, by volume, therefore, is 43·3 per cent.

TABLE II.—FOR TEMPERATURES ABOVE 60° F.

Per cent of Alcohol by Volume.	Number of F. Degrees Requiring SUBTRACTION of one to Percentage.	Per cent of Alcohol by Volume.	Number of F. Degrees Requiring SUBTRACTION of one to Percentage.
21	5·85	61	5·175
22	5·625	62	5·175
23	5·4	63	5·175
24	5·175	64	5·175
25	4·95	65	5·175
26	4·95	66	5·4
27	4·725	67	5·4
28	4·725	68	5·4
29	4·5	69	5·625
30	4·5	70	5·625

31	4·5	71	5·625
32	4·5	72	5·625
33	4·5	73	5·625
34	4·5	74	5·625
35	4·5	75	5·85
36	4·5	76	5·85
37	4·5	77	5·85
38	4·5	78	5·85
39	4·5	79	6·075
40	4·5	80	6·075
41	4·5	81	6·075
42	4·5	82	6·075
43	4·5	83	6·3
44	4·5	84	6·3
45	4·5	85	6·3
46	4·5	86	6·525
47	4·725	87	6·525
48	4·725	88	6·525
49	4·725	89	6·75
50	4·725	90	6·975
51	4·725	91	6·975
52	4·725	92	7·425
53	4·95	93	7·425
54	4·95	94	7·65
55	4·95	95	7·65
56	5·175	96	8·1
57	5·175	97	8·1
58	5·175	98	8·325
59	5·175	99	9·45
60	5·175	100	9.9

EXPLANATION.—In this case, the same calculation is performed as directed under Table I., except that the

correction is to be *deducted* instead of added.

Aside from the water present in it, commercial alcohol is never pure, but always contains small quantities, at times mere traces, of substances having a peculiar, sometimes pleasant, sometimes disagreeable, but invariably intense odor, which are known as fusel oils. The variety of fusel oil differs with the raw material from which the alcohol was made; there is a potato fusel oil (chemically amyl alcohol), a corn fusel oil, a beet fusel oil, wine fusel oil (œnanthic ether), etc. Fusel oils, being themselves odorous substances, exert an influence on the fragrance of the perfume; hence it is a general rule in perfumery to use only alcohol free from fusel oil; that is, such from which the fusel oil has been extracted as far as possible by means of fresh charcoal. So-called “Cologne Spirit” of the best quality is, as a rule, practically free from it.

Strange to say, some essential oils or aromatic substances in general, develop their finest odors only when the perfumes are prepared with an alcohol from a certain source. While the charcoal treatment removes almost all the fusel oil, the remaining traces suffice to act as odorous substances in the true sense of the term and to produce with other aromatic bodies a harmony of the odor which can never be reached by the use of another variety of alcohol. To give but a single instance we may state that all the citron odors known in perfumery develop the finest aroma only when dissolved in alcohol made from wine and the solution is then distilled. The world-renowned eau de Cologne is made in this way; the other aromatic substances contained in it are added to the distillate from the spirit of wine and the citron oils; any cologne made in another manner or with another alcohol has a less fine odor. While the citron odors require true spirit of wine for the development of their full aroma, other scents require beet or corn alcohol to bring out their best odor. Jasmine, tuberose, orange flowers, violet, etc., and all animal odors (ambergris, musk, and civet) belong to the latter class. For this remarkable and to the perfumer most important fact we know no other explanation than that traces of fusel oils present even in rectified alcohol take part in the general impression made on the olfactory nerves, acting as true aromatic substances.

Cologne spirit is expensive, but this should not be a reason for accepting a cheaper grade, with which it would be absolutely impossible to make really fine perfumes.

Alcohol is also generally used for the direct extraction of odorous substances from plants, as will be seen in the description of the processes employed in the

preparation of the so-called essences or extracts. For these purposes, too, the best cologne spirit only should be used, that is, alcohol which has been freed from fusel oil and redistilled, for in no other way can the aromatic substances be obtained in the greatest possible purity. And this is indispensable for the preparation of really fine perfumes, for we do not hesitate to say that French and English perfumes have acquired their deserved reputation mainly through the great care exercised in the selection of their raw materials, and especially of the alcohol used for extraction.

Alloxan.

This preparation, which is used in making a fine skin cosmetic, is manufactured in chemical laboratories from uric acid heated with nitric acid. Alloxan is a crystalline colorless body which has the property of gradually producing a red tint on the skin and finds employment for this reason.

Ammonia.

Ammonia is a gas formed by the decomposition of nitrogenous substances, but chiefly obtained, on a large scale, from the so-called "gas liquor" of gas works. By itself it develops a very disagreeable odor and stimulates the lachrymal glands to secretion—a fact which can be verified in any stable. A solution of the gas (water of ammonia; liquor ammoniæ) possesses the same properties. In perfumery ammonia is never used alone, but only in combination with other odors, namely, in the manufacture of smelling salts (French: sels volatils; German: Riechsalze), which are much in favor in England and in this country. For the purposes of the perfumer, the greater part of the commercial ammonia is unsuitable owing to its tarry odor. Pure ammonia is best prepared by heating equal parts of quicklime and powdered sal-ammoniac in a retort, and conducting the generated gas into water which dissolves it with avidity, one quart of water dissolving more than seven hundred quarts of ammonia gas.

Carbonate of Ammonia,

a combination of ammonia with carbonic acid, occurs in commerce in large transparent lumps, often covered with a white dust of bicarbonate of ammonia, which in the air continually develop ammonia and therefore always smell of it. This commercial product is, as a rule, sufficiently pure to be used in perfumery; as to its application the same remarks apply as were made under the head of ammonia.

Oil of Bitter Almonds (Oleum Amygdalæ amaræ).

This is made from bitter almonds, previously deprived of fatty oil by pressure, which are mixed with an equal weight of water and set in a warm place. The amygdalin undergoes decomposition into sugar, hydrogen cyanide, and benzoyl hydride or oil of bitter almonds. After one or two days the mass is distilled; the distillate being a colorless liquid, containing, besides oil of bitter almonds, hydrogen cyanide or prussic acid, one of the most virulent poisons, from which it must be freed. This is done by shaking the liquid repeatedly with dilute solution of potassa, followed by agitation with water. Pure oil of bitter almonds is not poisonous, but has a very strong narcotic odor of bitter almonds, which, however, becomes most marked when largely diluted with water.

Benzoic Acid (Acidum benzoicum).

This acid, contained in benzoin, is made also synthetically from other materials, in chemical laboratories. When pure it forms needle-shaped crystals having a silky gloss; they have a peculiar acrid taste, but no odor. Synthetic benzoic acid is worthless to the perfumer; in his art he can use only a benzoic acid made from gum benzoin by sublimation, because it contains a very aromatic essential oil for which the acid is merely the vehicle and which can also be employed alone.

As this sublimed benzoic acid is often adulterated with the artificial, we advise the manufacturer of perfumery to make his own benzoic acid according to the following directions.

The Manufacture of Sublimed Benzoic Acid.

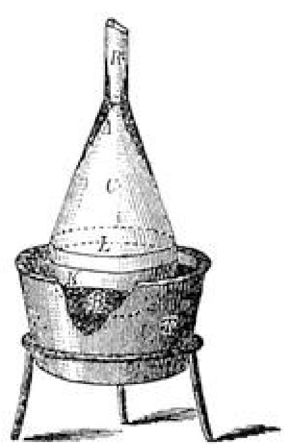

Fig. 3.

About four pounds of benzoin B of best quality is broken into small pieces and placed in a small copper boiler K (Fig. 3); over its entire surface is pasted white blotting paper L, and to this is pasted a cone of strong paper which must surround the edge of the boiler. The cone ends above in a paper tube R, about five feet long and an inch wide. The copper boiler is placed in a large clay pot T (a flower pot) and surrounded on all sides with fine sand. The clay pot is heated from without by a charcoal fire. After the pot has remained about half an hour on the fire, the latter is fanned to its utmost and kept at this point for thirty minutes. The heat volatilizes the benzoic acid, the above-mentioned essential oil, and some tarry substances of a brown color. The latter are arrested by the filter paper, while the benzoic acid is deposited on the cone and in the tube, in the form of delicate glossy needles which are very fragrant owing to the essential oil. The largest yield of benzoic acid is obtained when the temperature is raised very gradually, until finally nothing remains in the copper boiler but a brown, almost carbonized mass of a blistered appearance.

Borax (Sodii Boras)

is used in some preparations. Borax forms colorless crystals which slightly effloresce in dry air and hence must be preserved in tightly closed vessels. Reddish tinted crystals are contaminated with oxide of iron and should be rejected.

Permanganate of Potassium (Potassi Permanganas)

is a salt formed by fusing a mixture of manganese dioxide, potassa, and potassium chlorate, extracting the product with water, and evaporating the solution to crystallization; the salt is obtained in small dark violet, almost black crystals which dissolve in sixteen parts of water to which they impart a beautiful violet color. By contact with organic substances, or others easily oxidized, the solution changes its color into green and finally is decolorized, precipitating a brown powder. Owing to this change of color the salt has been called chameleon mineral. As its preparation requires considerable dexterity, it is preferable to buy it from reputable houses, rather than to make it. It is used in the manufacture of mouth washes and hair dyes. The solution of the salt causes brown stains on linen and the skin; they can be removed only if the spots are immediately washed with hydrochloric, oxalic, sulphuric, or another acid.

Acetic Acid (Acidum Aceticum).

Much confusion exists in the literature regarding the strength of acetic acid when merely called by this name. It is safe to assume that, in each country, the term applies to the acid officinal in its national pharmacopœia as “Acidum Aceticum.” Thus the Austrian and German pharmacopœias understand by it an acid containing 96% of absolute acetic acid, which is practically identical with what is known as glacial acetic acid. The latter is, in some pharmacopœias, distinguished by a special name: acidum aceticum glaciale, U.S. P.; acide acétique crystallisable, French Pharm.—In the present work, the author always intended the strong acid of the Austrian pharmacopœia to be understood when no other strength was designated. Like alcohol, strong acetic acid dissolves essential oils and is used in the manufacture of various toilet vinegars and washes. Acetic acid is made in chemical laboratories by distillation of acetate of sodium with sulphuric acid, or more commonly from wood vinegar. The buyer should always satisfy himself that the product is free from an empyreumatic odor which clings tenaciously to an insufficiently purified sample.

Fats.

Fats find extensive application in perfumery, in the preparation of the so-called huiles antiques, pomades, and many other cosmetics. They should be enumerated among the chemical products used in perfumery because they can never be employed in their commercial form, but must undergo some process of purification, which is effected less by mechanical than by chemical means. Commercial fats usually contain remnants of the animal or vegetable body from which they are derived: particles of blood and membranes occur frequently in animal fats; cell bodies and vegetable albumin in vegetable fats. Besides these mechanical impurities, fats, especially if old, sometimes contain small amounts of free fatty acids which suffice to impart to them the objectionable odor and taste peculiar to every rancid fat. While some fats, such as bear’s grease, butter of cacao, oil of sesame, and some others, remain free from rancidity for a long time, others undergo this change very rapidly; in fact, we may say that every fat which shows the slightest odor should be called rancid, for pure fat is absolutely odorless.

We shall here briefly describe the process employed in the fat industry and by perfumers for the purification of fats. Animal fat, such as lard, suet, bear’s grease, etc., as well as cocoanut and palm oils, are introduced into a large iron boiler containing dilute soda lye (not exceeding one per cent of caustic soda), and the lye is heated to boiling. In the boiler is a small pump terminating above in a curved tube having a rose of a watering-pot at the end. The pump is so

arranged as to raise lye and melted fat at the same time and to return the fluid into the boiler in a fine spray. After the fat is melted, the solid matters floating on top are skimmed off with a perforated spoon, and then the pump is operated for about fifteen minutes. The contained shreds of membrane and similar substances are completely dissolved by the soda lye, the free fatty acids are perfectly combined, and the fat is at the same time decolorized. After cooling, it floats on the surface of the lye as a colorless and odorless fluid; it is ladled off and poured into tall tapering vessels which are well closed and preserved in cool cellars. Contact with the air, especially at higher temperatures, causes rancidity of the fat. For every twenty pounds of fat twenty quarts of lye are used.

According to another process the fat is purified by being heated with alum and table salt; or every twenty-five pounds of fat, one ounce of alum and two ounces of salt are dissolved in five gallons of water. The scum is carefully skimmed from the surface of the melted fat, and, after it has solidified, the fat is washed with water until the latter escapes perfectly tasteless and odorless.

The washing is a very complicated and tedious piece of work. Operating on a small scale, a slightly inclined marble slab is taken, upon which a thin stream of water is constantly falling from a tube arranged above it. The fat is placed on the slab in small quantities (not over two pounds) and ground with a muller, like oil colors, under a constant flow of water. Owing to the expense of hand labor, it is advisable to use a so-called vertical mill or chaser. This consists of a level, circular, horizontal marble slab, bearing a central, easily movable axis with a crosspiece upon which two, likewise vertical, cylindrical marble plates turn like wheels in a circle on the horizontal marble plate. The fat is placed on the latter and continually irrigated with water; behind every chaser is applied a marble plate with a blade which nearly touches the chasers and returns the fat displaced laterally, under the chasers. The axis around which the chasers run is kept moving by any available power, and the laborer has nothing to do but to replace the washed fat with crude.

Liquid fats are purified as follows:

The oil is intimately mixed with one per cent of sulphuric acid. The mixture assumes a black color, the vegetable mucilage present in the oil becoming carbonized. After several days’ rest the oil becomes clear and floats on the surface of the sulphuric acid which has assumed a black color from the presence of finely divided carbon. The oil is decanted and treated, in the manner above stated for solid fats, with caustic soda lye. Heating can be dispensed with if the

pumping is continued for a longer time.

Benzoin and benzoic acid have the property of counteracting the tendency of fats to become rancid; it is advisable, therefore, to mix intimately with the completely washed fat a small amount of benzoic acid, at most one-one-thousandth part by weight.

The best way of preserving fats is by salicylic acid. This is added to solid fats while they are in a melted state; if oils, the acid is poured in and the bottle vigorously shaken. If the oil is in casks, a small bag filled with salicylic acid is hung into it from the bung-hole. The acid dissolves in the oil and is disseminated through it and thus effects its preservation. One-one-thousandth part by weight of the fat or oil is said to be more than sufficient to keep it perfectly fresh for years.

Fats differ largely in their physical properties—for instance, in their appearance, melting-point, firmness, etc. As we shall return to this subject in connection with the manufacture of some perfumes, it is enough here to state briefly that by the addition of spermaceti, wax, paraffin, etc., fats are made more transparent and firmer—a matter of importance for some cosmetic preparations.

Chinese Gelatin.

This substance, derived from several algæ, species of Eucheuma, indigenous to the Chinese sea, and identical with Japanese agar-agar, on being boiled with two hundred parts of water has the property of forming a colorless solution which solidifies on cooling. Owing to this property the addition of a small quantity of Chinese gelatin (0·1-0·2%) is an excellent means for imparting to certain pomades and ointments great transparency and firmness.

Fruit Ethers

are liquids which possess an agreeable, refreshing odor resembling that of some fruits. For this reason they are used in confectionery, in the manufacture of liqueurs, and also in many ways in perfumery. Chemically, fruit ethers are combinations of an organic acid—acetic, butyric, valerianic, etc.—with a so-called alcohol radicle such as ethyl and amyl. Their manufacture is connected with many difficulties and is but rarely attempted by perfumers, especially as these products are made a specialty in some chemical laboratories and are furnished at very low prices and of excellent quality. In perfumery the following fruit ethers are particularly employed.

Acetic Ether,

prepared by the distillation of acetate of sodium with alcohol and sulphuric acid, is a colorless liquid having an odor of fermenting apple juice, with a boiling-point at 74° C. (155° F.).

Pine-apple Ether

(ether or huile d'ananas) is made by the saponification of butter with solution of potassa, distillation of the soap with alcohol and sulphuric acid, and rectification of the distillate. It is an inflammable liquid with an intense odor of pine-apple; its boiling-point is 119° C. (246° F.). It is not generally used pure, as its odor needs some correction. This is accomplished by the addition of a little valerianate of amyl, and chloroform. Also in other ways.

Apple Ether,

prepared by distillation from valerianate of sodium with alcohol and sulphuric acid, and the subsequent addition of certain correctives (see below).

Pear Ether,

also called pear oil, chiefly valerianate of amyl oxide, can be obtained in large quantities from a by-product in the manufacture of potato spirit, namely, amyl alcohol, which is carefully heated in a still with bichromate of potassium and sulphuric acid. The product thus obtained has a very pleasant odor of fine pears and boils at 196° C. (385° F.). But the commercial "pear-essence" is a more complex body (see following table).

Nitrous Ether

is a very volatile liquid boiling at 16° C. (61° F.), which is obtained by distillation of strong alcohol with concentrated nitric acid and rectification of the distillate; it is less used in perfumery than the other fruit ethers.

Fruit ethers, owing to their low price and great strength, are frequently employed in the manufacture of cheap perfumery, in place of essential oils, but more largely for scenting soap.

The so-called raspberry and strawberry ethers consist of mixtures of acetic, pine-apple, apple, and other ethers (see following table), which, combined in certain proportions, really manifest an odor nearly akin to those of the fruits after

which they are named.

Fruit Ethers (Fruit Essences).

Table Showing the Ingredients Usually Employed for Preparing Artificial Fruit Ethers (Fruit Essences).

A = Peach.	I = Apple.
B = Apricot.	J = Grape.
C = Plum.	K = Gooseberry.
D = Cherry.	L = Raspberry.
E = Black Cherry.	M = Strawberry.
F = Lemon.	N = Melon.
G = Pear.	O = Pine-apple.
H = Orange.	

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Glycerin		5	4	8	3	..	5	10	10	1	2	..	..	..	..	1
Chloroform		..	1	..	..	..	1	..	2	1	..	..	1	1	..	..
Nitrous ether		..	..	..	..	..	1	..	..	2	2	1	1	..	2	1
Aldehyde		2	..	5	..	..	2	..	2	1	..	5	5	5	..	..
Acetate of ethyl		5	..	5	5	10	10	5	5	..	2	..	1	1	1	..
Formate of ethyl		5	..	1	..	..	..	..	1	..	..	..	1	5	4	5
Butyrate of ethyl		5	10	2	..	..	..	..	1	..	..	..	..	..	5	..
Valerianate of ethyl		5	5	..	..	..	..	..	..	..	..	1	1	..	..	..
Benzoate of ethyl		..	..	..	5	5	..	..	1	..	10	1	1	..	..	..
Œnanthate of ethyl		5	1	4	1	2	..	..	..	..	1	..	1	1	..	..
Salicylate of methyl		2	2	..	..	..	..	..	1	..	..	..	1	..	10	..
Sebacic acid		1	..	..	..	..	..	10	..	..	..	..	1	3	..	10
Acetate of amyl		..	..	..	..	..	..	..	10	10	..	..	..	2	..	..
Butyrate of amyl		..	1	..	..	..	10	..	..	..	..	..	..	..	..	..
Valerianate of amyl		..	..	..	..	..	..	..	..	..	..	5	5	..	..	..
Essence of orange		..	..	..	..	..	10	..	10	1	5	..	..	..	..	..
Alcohol, solutions saturated in	Tartaric acid	..	..	..	..	1	..	..	1	..	..	1	1	..	..	..
	Oxalic acid	..	1	..	..	..	1	..	..	..	3	1	..	..	..	..

the cold of	Succinic acid	..	..	..	1	2	..	..	..	..	..	..	1	..	..	..
	Benzoic acid	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..

Glycerin.

This substance, which may be called a true cosmetic in itself, as it possesses marked solvent power for cutaneous coloring matters and at the same time imparts to the skin delicacy and flexibility, is at present to be had commercially in great purity. Pure glycerin is a brilliant, colorless, and odorless substance of the consistence of a thick syrup, which mixes with water and alcohol in all proportions and has a slightly warm but very sweet taste. It readily absorbs aromatic substances and is used in many valued toilet articles in combination with fats and perfumes. Recently we have succeeded in using glycerin most successfully for the extraction of aromatic substances.

Oil of Mirbane,

also called artificial oil of bitter almonds, nitrobenzol, and essence of mirbane. This substance, which is now largely used in perfumery and soap manufacture, is obtained by the action of fuming nitric acid on benzol. The mixture becomes hot and emits masses of brown vapors, and there is formed a yellow oily body which is washed with water and soda solution until the washings escape colorless. Pure nitrobenzol is not soluble in water, but in alcohol or ether, boils at 213° C. (415° F.), and congeals at-5 to 6° C. (21-23° F.). Its spec. grav. is 1·2 or a little over. Any oil of mirbane having a lower specific gravity than 1·2 at 15° C. (59° F.) is spurious, most likely nitrotoluol. Its odor greatly resembles that of oil of bitter almonds, but can be clearly differentiated from it on comparison. Care must be taken in inhaling the vapor when undiluted, as it is poisonous. By distillation nitrobenzol can be obtained quite colorless, and in this form is often used for the adulteration of genuine oil of bitter almonds. This adulteration, however, can be easily demonstrated by heating for a short time with an alcoholic solution of a caustic alkali which separates from nitrobenzol a brown resinous substance, while true oil of bitter almonds loses its odor and changes into benzoic acid which unites with the alkali.

Paraffin.

This substance is one of the products of the distillation of petroleum, coal, peat, and other carbonaceous sources. It is a crystalline, brittle body, closely resembling wax in appearance and melting between 51 and 60° C. (124 and 140°

F.). Paraffin, which is now made on a large scale for the manufacture of candles, is very useful in perfumery as a partial substitute for the much more expensive wax or spermaceti, over which it has the advantage, besides its cheapness, that it imparts to the articles great transparency—a quality which is valued highly in fine perfumeries. The addition of some paraffin to pomades renders them more consistent and counteracts their tendency to become rancid. Distilled paraffin always has a crystalline form, differing from the paraffin-like residues left after the distillation of petroleum (so-called vaselins, etc., see below) which are always amorphous.

Pyrogallic Acid

appears in commerce as a white crystalline powder, made by heating gallic acid to 200-210° C. (392-410° F.). With iron salts, pyrogallic acid forms bluish-black combinations and precipitates the metal from silver solutions as a velvety-black powder. On account of these properties pyrogallic acid is used in perfumery as a constituent of some hair dyes.

Sulphide of Potassium,

liver of sulphur, hepar sulphuris, potassii sulphuretum, the pentasulphide of potassium, is obtained by fusing together potash and sulphur, in the shape of a leather-brown mass which is soluble in water and on exposure to the air is gradually decomposed with the development of the offensive sulphuretted hydrogen gas; hence it should be preserved in well-closed vessels. An aqueous solution of this substance forms with lead or silver salts a black precipitate of sulphide of lead or silver, and is used for some hair dyes.

Starch Flour

(amylum) is prepared from various vegetables such as potatoes, rice, arrowroot, sago, etc., and when pure appears as an insoluble white powder which the microscope shows to be grains consisting of many superimposed layers. In commerce the price of the different varieties of starch fluctuates greatly; in perfumery well-cleansed potato starch can very well be used for dusting powders, and the so-called poudre de riz; in this country, corn starch is preferable.

Vanillin,

that is, the body to which vanilla owes its fragrance, is now made artificially

and can be used in place of vanilla for soaps and pomades.

Vaselin.

In the distillation of petroleum there remain in the still as a residue large quantities of a substance which when purified is colorless and, according to the nature of the petroleum, at ordinary temperatures has either the consistence of lard, melting under the heat of the hand, or forms an oily liquid. In perfumery vaselin can be used like fat or oil, over which it has the advantage in that it always remains odorless and free from acid; hence it is very appropriate for the manufacture of pomades. The market affords numerous varieties of this substance, under different names: vaselin (oil and solid), albolene (oil and solid), cosmolin, etc., etc.

Spermaceti

is a substance found in the skull cavities of several whales and dolphins. In its properties it stands midway between beeswax, paraffin, and firm fats. In the living animal spermaceti is fluid, but after its death it congeals to a white crystalline mass of a fatty lustre, which melts at 40° C. (104° F.), and is frequently used for fine candles as well as for other articles.

Wax

(Cera alba), the well-known product of the bee; in perfumery only bleached (white) wax is employed. In recent years Japanese wax has appeared in commerce; this is of vegetable origin, but in its properties resembles beeswax.

Subnitrate of Bismuth,

bismuth white, pearl white, bismuthi subnitras, blanc de bismuth, blanc de perles, the basic nitrate of bismuth, the chief ingredient of many skin cosmetics, is prepared by dissolving metallic bismuth in moderately strong nitric acid, and pouring the solution into a large quantity of water, whereupon the subnitrate is precipitated.

The precipitated powder is collected on a funnel and washed with pure water until the wash water no longer changes blue tincture of litmus to red. The bismuth white is dried and preserved in well-closed vessels, since in the air it gradually assumes a yellowish color; for any sulphuretted hydrogen present in the air is greedily absorbed by this salt, and the resulting combination with

sulphur has a black color.

Oxide of Tin

is obtained by treating metallic tin with fuming nitric acid, adding the solution to a large quantity of water, and washing the product, which forms a white insoluble powder used cosmetically for polishing the finger nails.

Besides the chemical products here enumerated, some others find application in perfumery; we shall describe their properties in connection with the articles into which they enter. In this connection mention may be made of the fact that more and more aromatic substances are now made artificially which were formerly obtained with difficulty from plants. Besides vanillin mentioned above, cumarin, oil of wintergreen, and some other products are prepared artificially. Heliotropin and nerolin are artificially prepared substances, possessing an odor resembling that of heliotrope and oil of neroli, respectively, but not identical chemically with the natural odorous substance. Artificial musk (Baur's), is playing a rôle at present, but is not identical with the natural substance.

C. The Colors used in Perfumery.

Some articles are colored intentionally; this remark applies particularly to some soaps which not rarely are stained to correspond to the color of the flower whose odor they bear; for instance, violet soap. Some articles again are used only on account of their color; for instance, paints, hair and whisker dyes. As we shall discuss this subject at greater length in connection with these toilet articles, we merely state here that nowadays every manufacturer can choose between a large number of dyes of any color, all of which are innoxious; hence no perfumer should under any circumstances use poisonous colors. This is a matter of importance with substances intended for immediate contact with the human body such as paints, lip salves, soaps, etc. All of these colors will be described hereafter.

CHAPTER VII.
THE EXTRACTION OF ODORS.

Excepting the articles made in Turkey and India (especially oil of rose), most aromatic substances are manufactured in southern France and the adjoining regions of Italy, while a few (oils of peppermint and lavender) are produced in England; a few also (oils of peppermint, spearmint, wintergreen, sassafras, etc.) in the United States. However, as we have stated above, it is possible to cultivate some plants from which odors are extracted in the warm sections of this country, and to obtain the most expensive perfumes from them. Among these plants our experience leads us to suggest violets, roses, reseda, lavender, mints, syringa, lilac, and several others to which the climate is adapted.

The methods by which the odors can be extracted from the plants differ according to the physical properties of the raw material and the chemical composition of the aromatic substance. We shall here briefly describe the methods thus far known, and at the same time add our own experience in this most important part of the art of perfumery. The aromatic substances are obtained by pressure, by distillation, by maceration (infusion), by absorption (enfleurage) through air or through carbonic acid, and by extraction.

PRESSURE.

Certain aromatic substances that occur in large amounts in some parts of plants, are best obtained by pressure. The rinds of certain fruits contain an essential oil in considerable quantities inclosed in receptacles easily distinguished under the microscope. When these vegetable substances are subjected to strong pressure, the oil receptacles burst and the essential oil escapes. The force is usually applied through a screw press with a stout iron spindle; the vegetable substances being inclosed in strong linen or horse-hair cloths, placed between iron plates, and subjected to a gradually increasing pressure. Comparative experiments have shown us that even with the most powerful presses a considerable, amount of oil is lost owing to the fact that a large number of oil receptacles remain intact. For this reason, when oil is to be extracted by pressure, a hydraulic press is preferable, as it develops greater power than any other press. In the hydraulic presses used for this purpose the piston fits exactly into a hollow iron cylinder with sieve-like openings in its

circumference. The vegetable substances are filled into this cylinder; when the pressure is applied, the fluids escape through the perforations, and the residue forms a compact woody cake which is then free from oil.

Besides the essential oil, watery fluid is expressed, the whole appearing as a milky liquid, owing to the admixture of vegetable fibres, mucilage, etc. It is collected in a tall glass cylinder which is set in a place free from any vibration. After remaining at rest for several hours the liquid separates into two layers, the lower being watery and mixed with mucilage, that floating on top being almost pure oil. The latter is separated, and finally purified by filtration through a double paper cone in a funnel covered with a glass plate.

Fig. 4.

It is best to separate the water and oil in a regular separatory funnel, or in a simple apparatus illustrated in Fig. 4. It is made by cutting the bottom from a tall flask, and fitting into the neck by means of a cork a glass tube having a diameter of one-fourth to one-half inch. A rubber tube with stop-cock is fastened to the glass tube. By careful opening of the stop-cock, the watery fluid can be drained off to the last drop.

To the perfumer this method is of little importance, since it is applicable only to a few substances which, moreover, give cheap odors. Still, the possession of a hydraulic press is advisable to every manufacturer who works on a large scale, as it is useful also in the preparation of several fixed oils frequently employed in perfumery, for instance, oils of almonds, nuts, etc.

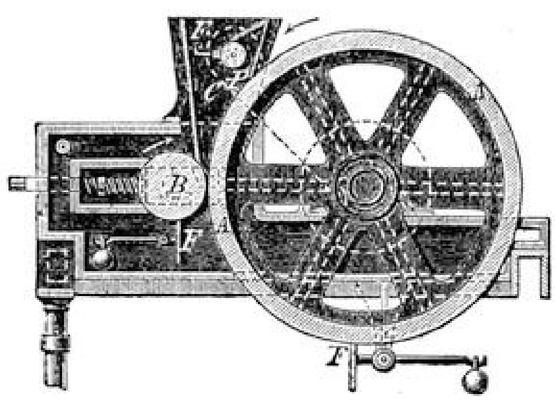

Fig. 5.

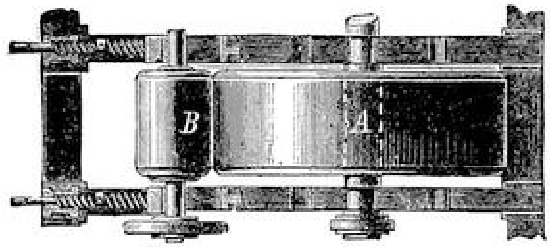

Fig. 6.

Fixed oils are best extracted in so-called drop presses, the material having first been comminuted between rollers. These are arranged as shown in section in Fig. 5, and in ground plan in Fig. 6. The apparatus consists of two smooth or slightly grooved iron cylinders A and B, respectively four feet and one foot in diameter, which can be approximated or separated by means of set screws. The material is placed into the trough F containing a feeding roller moved by the belt P. The scrapers FF, pressed against the cylinders by means of weighted levers, free the rollers from adhering pieces.

The drop presses Figs. 7 and 8 consist of a hydraulic press with cylinders A and piston B; the troughs E are movable by means of rings between two vertical columns and every trough has a circular gutter *d* for the reception of the expressed oil. The iron pots G have double walls, the inner of which has a series of openings at its upper part; these pots are filled with the bruised material to be pressed and after this has been covered with a plate of horse-hair tissue are set in the press.

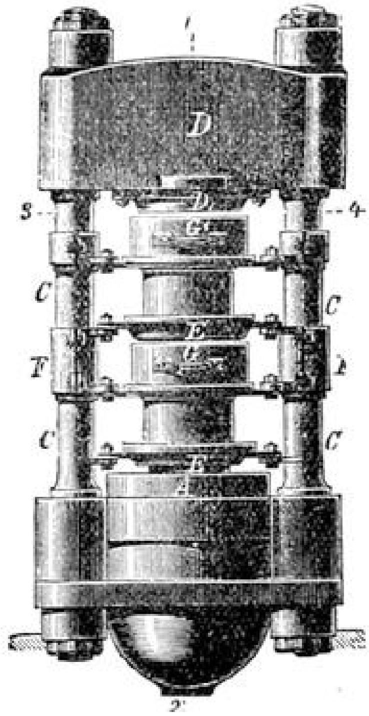

FIG. 7.

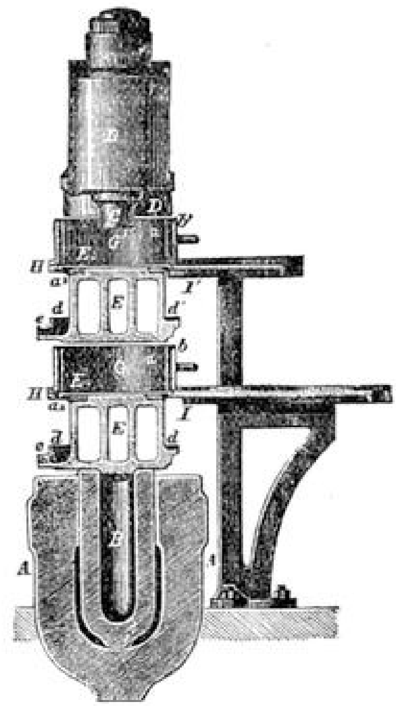

FIG. 8.

As the piston rises, the troughs E sink into the pots, the escaping oil collects in the gutters *d* and thence passes into a receptacle. After pressing, the piston is allowed to sink back, the pots G are drawn aside (Fig. 8) to tabular surfaces, and other pots are substituted for the exhausted ones. These drop presses are suitable for the extraction of all fixed oils and also volatile oils present in orange and lemon peel, etc.

DISTILLATION.

Many odors or essential oils possess the remarkable property that their vapors pass so largely with that of boiling water that they can be extracted in this way (by "distillation") from vegetable substances, though the essential oils have a boiling-point far above that of water. Distillation can be employed for a large number of substances; for instance, the essential oils present in cumin, anise, lavender, fennel, mace, nutmeg, etc., are extracted exclusively in this manner.

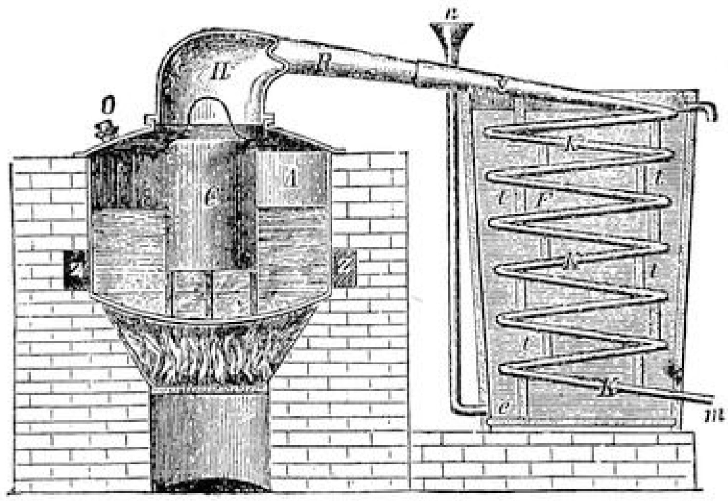

Fig. 9.

For the extraction of odors in this way, according to the quantities of material to be worked, different apparatuses are used, some of the most important of which will be here described.

For manufacturers who run without steam and are obliged to use a naked flame, the adjoining apparatus (Fig. 9) will be advantageous.

It consists of a copper boiler A, the still, set in a brick furnace. The latter is so constructed that the incandescent gases strike not only the curved bottom of the still, but also its sides through the flues Z left in the brickwork. The still, whose upper part projects from the furnace, has an opening O on the left side, closed air-tight with a screw, which serves for refilling with water during distillation when necessary. To the margin of the still is fitted steam-tight the helm H, made of copper or tinned iron, having a prolongation, the tube R. The latter is joined to the conical projection *v* which terminates in the worm K. In some apparatuses this projection is omitted and the tube immediately joins the worm. The latter is made of tinned iron and, as the cut shows, is arranged in coils and supported by props *t* in the wooden or metal condenser F. The condenser bears above a short bent tube *b*, and below, immediately over the bottom, an elbow tube *e*, long enough to reach above the edge of the condenser, as indicated in the cut.

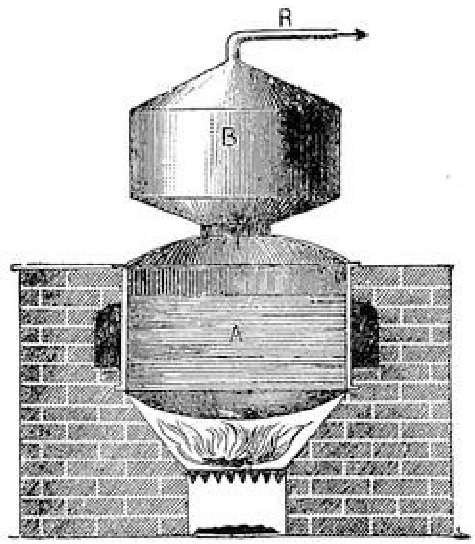

Fig. 10.

The vegetable substances to be distilled can be put immediately into the still and covered with water; but in this case it is advisable to use a stirrer which must be kept moving until the water boils, otherwise the material might burn at the bottom. But this accident can also be prevented by applying a perforated false bottom to the still above the flues, or by inclosing the material in a wire-sieve basket C.

In place of the basket C the apparatus can also be provided with an additional vessel containing the material to be distilled. In the still A (Fig. 10) the water is brought to boiling, the steam rises through the second still B in which the material is spread on a perforated bottom. The steam laden with the vapors of the essential oil passes through the tube R into the condenser.

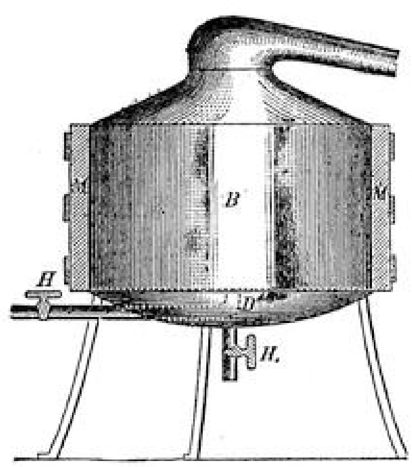

Fig. 11.

It is very advantageous, and in large establishments altogether indispensable, to use steam in the distillation of essential oils. Fig. 11 represents the arrangement of such an apparatus. The still B (which in this case may be made of stout tinned iron) stands free and is provided with a wooden jacket M for the purpose of retaining the heat. Immediately above the curved bottom is a perforated plate on which the material rests. The tube D which enters the bottom of the still is connected with the boiler which furnishes steam at moderate tension. H is the faucet for the admission of steam; H. is the faucet by which the water escapes from the still at the end of the operation. After the still is filled with the material, the faucet H is opened gradually and a continuous stream of steam is allowed to pass through the still until the operation is finished.

When working with an open fire, as soon as vapors appear at the lower end of the worm (Fig. 9), cold water is admitted through the tube *ne*; as the cold water abstracts heat from the vapors and condenses them, it becomes warm, rises to the surface, and escapes through *b*, so that the worm is continually surrounded with cold water. If for any reason the saving of cold water is an object, its flow may be so regulated that the vapors are just condensed, the warm distillate being allowed to cool in the air. When working with steam, the cold water must be admitted the moment the steam-cock is opened, and the flow of cold water should be ample during the distillation, which in this case is much shorter.

The large apparatuses here described are generally used, especially for the extraction from vegetable substances of odors present in considerable quantity, for instance, mace, nutmeg, cloves, cinnamon, etc., or from bulky material as the various flowers. For very expensive odors, smaller apparatuses are often employed, the construction of which resembles that of the ones described. For this purpose small glass apparatuses are very suitable; they are illustrated in Fig. 12.

The still, a retort A, consists of a spherical vessel with a bottle neck *t* which is either closed with a cork or carries a thermometer or glass tube, and with a lateral tube, the neck of the retort, connected with the adapter *r*. The latter passes into the condenser C. At the lower end of R is the bent adapter *v* under which is placed the receptacle for the distillate. The tube C is closed with corks, at its lower end is the ascending tube *h*, and at its upper end the descending tube *g*. During the distillation cold water flows in through *h* which cools the tube *r* and escapes at *g*. The tube C, as will be readily understood, acts like the condenser in the larger apparatuses above described. In order to prevent the breaking of the retort, it is not heated over a flame, but is set in a tin vessel B filled with water.

The comminuted vegetable material is inserted with water through the up-turned neck of the retort into the latter; the vessel B is filled with water which is raised to the boiling-point.

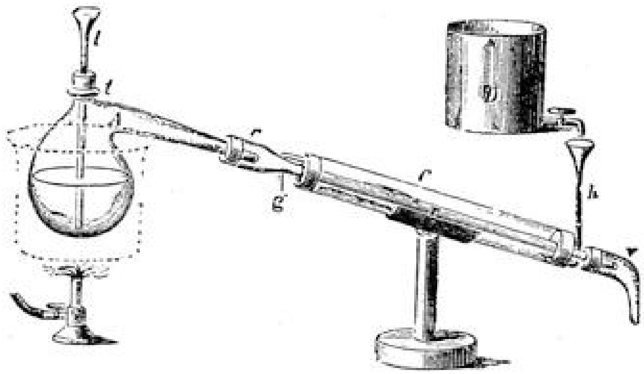

FIG. 12.

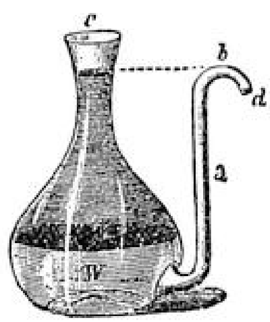

FIG. 13.

During distillation we obtain at the lower end of the condenser pure water and essential oil. When larger quantities are to be distilled it is advisable to use a Florentine flask as a receptacle for the separation of the oil and water (Fig. 13). It consists of a glass bottle from the bottom of which ascends a tube curved above; the latter rises high enough to bring the curvature slightly below the neck of the flask. During the distillation the flask becomes filled with water W, on which floats a layer of oil O; the excess of water escapes through *a* at *d* until the flask finally contains more oil and very little water.

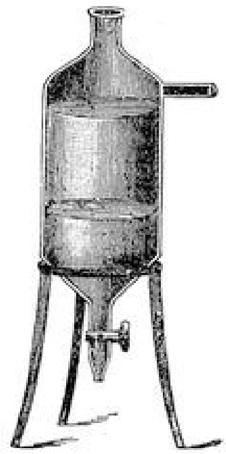

Fig. 14.

When producing essential oils on a large scale, instead of the frail Florentine flasks it is advisable to use separators, the construction of which is illustrated in Fig. 14. They consist of glass cylinders, conical above and below, supported on a suitable frame. The water accumulating under the oil is allowed to escape by opening the stop-cock; when the first separator is filled with oil, the succeeding distillate passes through the horizontal tube into the next separator, etc.

When the distillation is carried on in an ordinary still, we obtain, besides the essential oil, a considerable quantity of aromatic water, that is, a solution of the oil in water.

An apparatus which obviates the losses caused thereby is that of Schimmel described below, which is well adapted to the manufacture on a large scale. The apparatus is patented.

The nearly spherical still D (Fig. 15) is surrounded by a jacket M; the inlet steam tube R is connected with a branch *r* which enters the interior of the still as a spiral tube with numerous perforations, while R opens into the space M. When *r* is opened, distillation takes place by direct steam; when R is opened, by indirect steam; when both faucets are opened, the still is heated at the same time with direct and indirect steam.

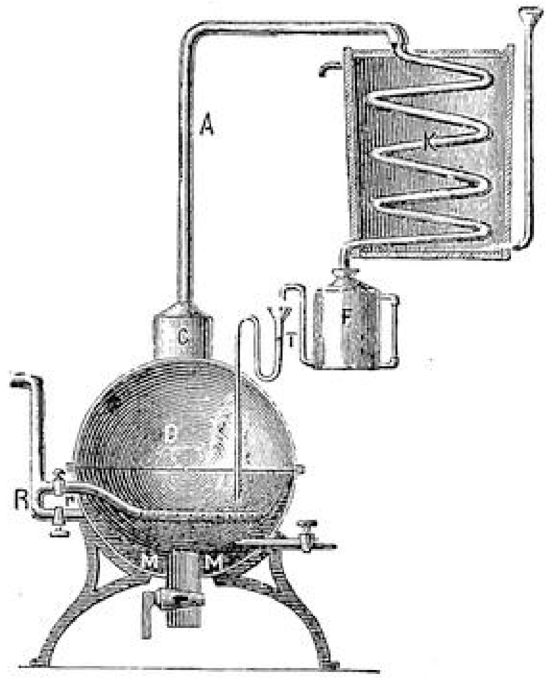

Fig. 15.

The vapors rising from the still D pass through the helm C and the tube A into the worm K; the fluid condensed in the latter drops into the tin Florentine flask F, the aromatic water flowing from the latter passes back into the still D through the Welter funnel T and is distilled over again, so that the entire distillation can be effected with very little water, and it is continued until the water escaping from the Florentine flask is freed from oil and odorless.

When working with superheated steam, it is necessary to set under the funnel tube T a vessel twice the size of the Florentine flask, which is provided with a stop-cock above and below. The lower cock is closed, the vessel is allowed to fill with water from F, then the upper cock is closed, the contents being allowed to escape into D by opening, when the cocks are again reversed.

The use of superheated steam is important especially with material which gives up the contained oil with difficulty, such as woods.

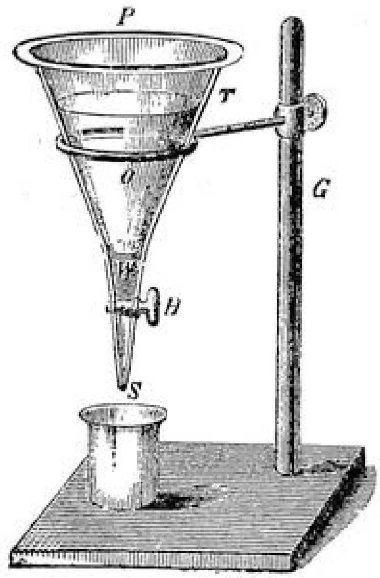

Fig. 16.

For freeing the essential oil completely from water we use a so-called separating funnel (Fig. 16). This consists of a glass funnel T resting on a suitable support G, which is closed above with a glass plate ground to fit, drawn out below into a fine point S, and provided with a glass stop-cock H. The contents of the Florentine flask are poured into the funnel which is covered with the glass plate and allowed to stand at rest until the layer of oil O is clearly separated from the water W. By careful opening of the stop-cock the water is allowed to escape and the oil is immediately filled into bottles which are closed air tight and preserved in a cool and dark place.

Maceration (Infusion).

Some odors, like those of cassie, rose, reseda, syringa, jasmine, violets, and many other fragrant blossoms, cannot be obtained by distillation as completely or as sweet-scented as by the process of maceration which is in general use among the large perfumers in southern France. This process is based on the property of fats to absorb odorous substances with avidity and to yield them almost entirely to strong alcohol. According to the fat employed for the maceration of the flowers—a solid fat like lard or a liquid like olive oil—odorous products are obtained which are known either as pomades or as perfumed oils (huiles antiques). By repeatedly treating fresh flowers with the same fat the manufacturer is able to perfume the pomade or oil at will, and in the factories these varying strengths are designated by numbers; the higher numbers indicating the stronger products.

The process of maceration is very simple. The fat is put into porcelain or enamelled iron pots which are heated, in a shallow vessel filled with water, to 40 or at most 50° C. (104-122° F.); the flowers are inclosed in small bags of fine linen and hung into the fat, where they are allowed to remain for from one-half to two days. At the end of that time the bags are removed, drained, expressed, refilled with fresh flowers, and replaced in the fat. This procedure is repeated twelve to sixteen times or oftener, thus producing pomades or oils of varying fragrance.

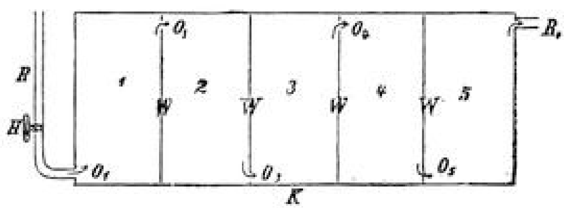

FIG. 17.

As the odors are much superior when the flowers are only a short time in contact with the fat, it is better to use an apparatus for continuous operation (Fig. 17). It consists of a box K made of tin plate, which is divided into from five to ten compartments by vertical septa and can be closed water tight by a lid to be screwed on. The septa have alternate upper and lower openings. The compartments contain each a basket of tinned wire filled with the flowers for maceration, then the lid is closed and the box heated in a water bath to 40 or 50° C. (104-122° F.). The stop-cock H in tube R is now opened. This admits melted fat or oil from a vessel above to the first compartment in which it rises through the basket filled with flowers whose odor it abstracts. The additional fat coming from above drives it over through the opening O_2 into compartment 2, where it comes in contact with fresh flowers, passes through O_3 into the third compartment, and so on through 4 and 5, until it finally escapes through R_1 well charged with odor. According to requirements a larger number of compartments may be employed.

When all the fat has passed through the apparatus, it is opened, the basket is removed from compartment 1, the basket from No. 2 is placed in 1, that from 3 in 2, etc.; basket 1 is emptied, filled with fresh flowers, and placed in compartment 5, so that every basket gradually passes through all compartments to No. 1. In this way the fat rapidly absorbs all the odor.

The odorous substances are abstracted from the pomades or huiles antiques by

treatment with strong alcohol (90-95%) which dissolves the essential oils but not the fats. The huiles antiques with the alcohol are placed in large glass bottles and frequently shaken. In order to abstract the odors from pomades, the latter are allowed to congeal and are divided into small pieces which are inserted into the bottles of alcohol. A better plan is to fill the pomades into a tin cylinder with a narrow opening in front and to express the pomades, by a well-fitting piston, in the shape of a thin thread which thus presents a large surface to the action of the alcohol, thus hastening the absorption of the odor. The alcoholic solution obtained after some weeks is then distilled off at a low temperature. We shall recur to this hereafter.

No matter how long the fats are left in contact with alcohol, they do not yield up to it all the odor, but retain a small portion of it and hence have a very fragrant smell. They are, therefore, brought into commerce as perfumed oils or pomades bearing the name of the odorous substance they contain: orange flower, reseda pomade or oil, etc.; they are highly prized and are sometimes used again for the extraction of the same odor.

Some odors cannot bear even the slight rise of temperature necessary for their extraction by the method of maceration or infusion. For these delicate odors one of the following methods may be employed.

Absorption or Enfleurage.

In this method the absorbing power of fat is likewise used for retaining the odors, but the flowers are treated with the fat at ordinary temperatures. This procedure which is employed especially in southern France is carried out as follows. The fat (lard) is spread to a thickness of about one-quarter inch on glass plates G one yard long and two feet wide, which are inserted in wooden frames R and sprinkled with flowers F (Fig. 18). The frames are superimposed (the cut shows two of the frames) and left for from one to three days, when fresh flowers are substituted for the wilted ones, and so on until the pomade has attained the desired strength.

Fig. 18.

This procedure is very cumbrous and tedious and therefore had better be modified thus: In an air-tight box K (Fig. 19) we place a larger number of glass plates *g* covered with lard drawn into fine threads by means of a syringe. This box is connected with a smaller one K_1 which is filled with fresh flowers and provided with openings below and above, O and O_1. The latter, O_1 communicates by a tube with box K, at whose upper end is a tube *e* terminating in an exhaust fan so that the air must pass through the apparatus in the direction indicated by the arrows. A small fan V driven by clockwork will answer. The air drawn from K_1 is laden with odors and in passing over the fat as shown by the arrows gives them up completely to the fat. The use of this apparatus has very important advantages: the absorption is effected rapidly, requires little power, and the flowers do not come at all into contact with the fat which therefore can take up nothing but the odors present in the air.

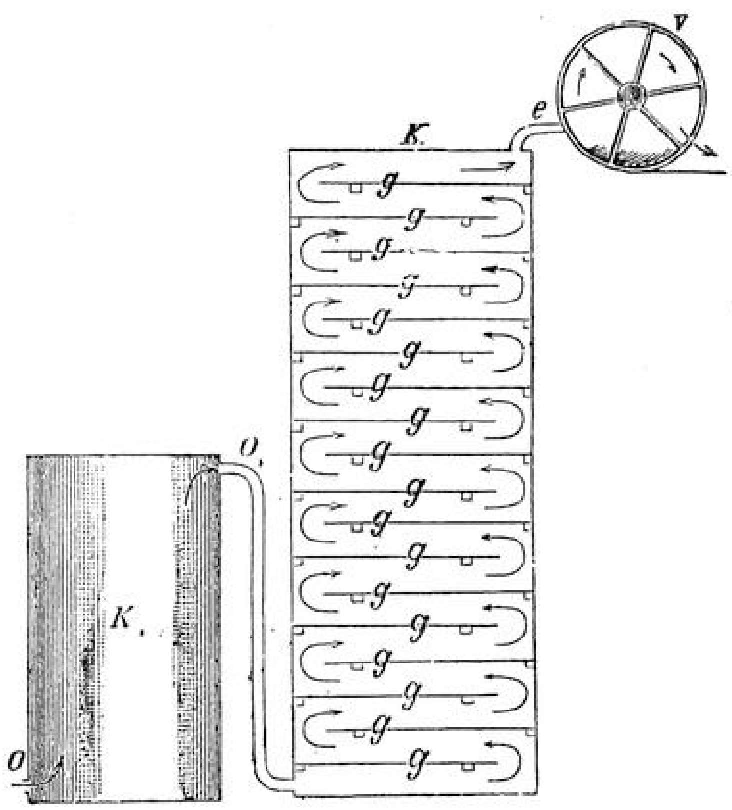

FIG. 19.

Instead of charging the fat with odors by either one of the methods here described, carbonic acid can also be employed with advantage, by means of the apparatus illustrated in Fig. 20. The large glass vessel G contains pieces of white marble M upon which hydrochloric acid is poured at intervals through the funnel

tube R. A current of carbonic acid is thus developed, which passes through a wash bottle W filled with water, then through the tin vessel B containing fresh flowers, and finally into a bottle A filled with strong alcohol and set in cold water, after which it escapes through the tube *e*. The carbonic acid absorbs the aromatic vapors from B and leaves them in the alcohol which absorbs them. (G, R, W are made of glass, B of tin.)

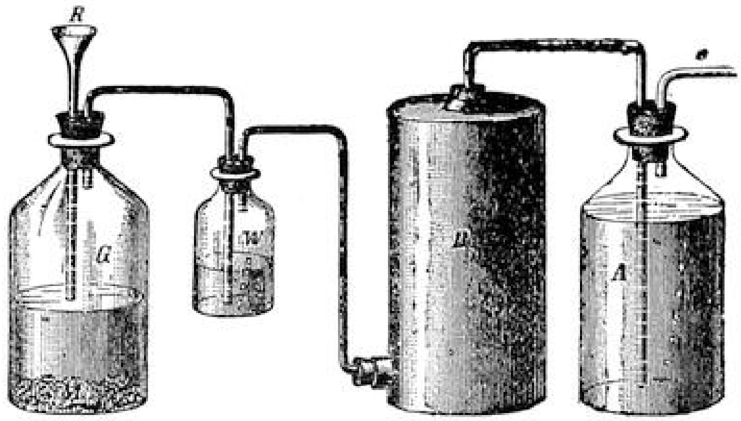

Fig. 20.

Extraction.

This method is based on the fact that some volatile liquids such as ether, chloroform, petroleum ether, or bisulphide of carbon possess the property of rapidly extracting the aromatic substances from flowers; when they are evaporated at a gentle heat they leave the pure odors behind. In our opinion this process is the best of all for the perfumer and it is to be regretted that it is not more generally used.

As a rule we employ either petroleum ether or bisulphide of carbon (see above, pp. 65, 66) because these products are cheaper than ether or chloroform.

The apparatus we use for this purpose is illustrated in Fig. 21. It consists of a cylinder C made of tinned iron, which is provided above with a circular gutter R terminating in a stop-cock *h* and which can be closed by a lid D bearing a stop-cock *o*. A tube *b* with a stop-cock *a* enters the bottom of the cylinder. The latter is filled with the flowers, the volatile liquid (petroleum ether, bisulphide of carbon, etc.) is poured over them, the lid is put on, and the gutter R filled with water, thereby sealing the contents of the vessel hermetically.

After the extraction, which requires about thirty to forty minutes, stop-cock *o*

is opened first, then stop-cock *a*, and the liquid is allowed to escape into the retort of the still (Fig. 12). If the extraction is to be repeated, the water is allowed to escape from the gutter through *h*, the lid is opened, and the solvent is again poured over the flowers.

For operation on a larger scale the glass retorts are too small and should be replaced by tin vessels (Fig. 22) having the form of a wide-mouthed bottle F; they are closed by a lid D which is rendered air tight by being clamped upon the flange of the vessel (R) with iron screws S, a pasteboard washer being interposed; a curved glass tube connects the apparatus with the condenser of Fig. 12.

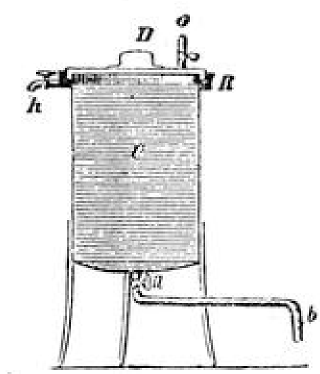

FIG. 21.

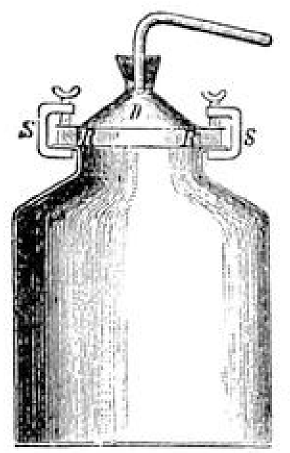

FIG. 22.

The solutions of the aromatic substances are evaporated in these apparatuses at the lowest possible temperature, the solvent being condensed and used over again. The heat required is for ether about 36° C. (97° F.), for chloroform about 65° C. (149° F.), for petroleum ether about 56° C. (133° F.), and for bisulphide of carbon about 45° C. (113° F.). If it is desired to obtain the aromatic substances pure from an alcoholic extract of the pomades made by one of the above-described processes—which is rarely done since these solutions are generally used as such for perfumes—a heat of 75 to 80 C. (167 to 176° F.) is required.

Another extraction apparatus illustrated in Fig. 23 is well adapted to operations on a large scale. Its main parts are the extractor E and the still B. The former is set in a vat W continually supplied with cold water. The still B is surrounded with hot water in the boiler K.

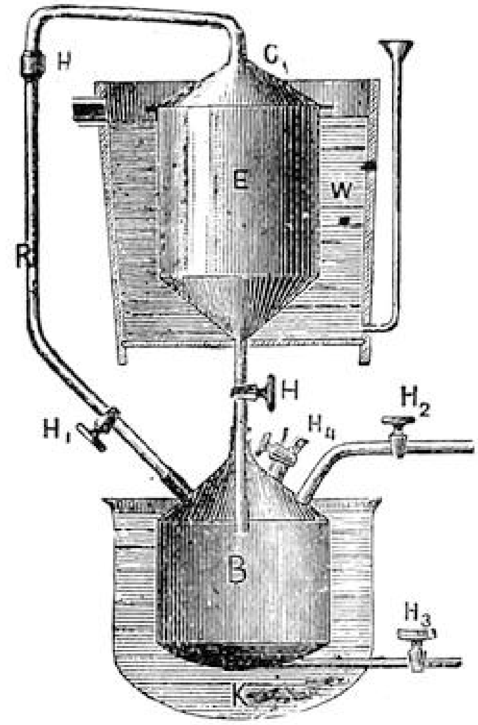

Fig. 23.

To start the apparatus the cone C is removed, the vessel E is filled with the material to be extracted, and C is replaced. The faucets H_2 and H_4 are opened, the solvent is poured into the still through the latter, when these faucets are closed and those marked H and H_1 are opened.

The water in K is heated until the contents of B are in brisk ebullition; the vapor rises through RH, is condensed on entering E and falls in small drops on the material. This fine rain of the solvent dissolves the aromatic substances and flows back into B, where it is again evaporated, and so on.

At the end of the extraction the faucets H and H_1 are closed and H_2, is opened. The vapors of the solvent pass through it into a worm where they are condensed; the essential oil remaining in B is drained off by opening H_3.

For still larger operations more perfect apparatuses are employed, such as those of Seiffert and Vohl. Seiffert's apparatus (Fig. 24) consists of a battery of jacketed cylinders; steam circulates in the space between the cylinders and the jackets. Each cylinder contains a plate covered with a wire net on which the flowers to be extracted are placed. All the cylinders having been filled and closed, the solvent is admitted from a container above, through S and *a* into C^2;

when this is filled the liquid flows through $a^2b^3c^n$ into C. The solution saturated with essential oil leaves the apparatus through d^n and p and enters a reservoir. The course of the liquid is aided by the suction of an air-pump acting on p.

When the reservoir contains an amount of fluid equal to that in C^n, d^n is closed, a^n is opened, and C connected with C^1 through b^n and c^1. That the contents of C^2 are completely extracted is shown by the fact that the liquid appears colorless in the glass tube inserted in b^2; a^1 and C^2 are closed; a^2 and C^3 are opened, thereby excluding C^2 from the current of bisulphide of carbon which then flows through $C^3C^nC^1$. In order to permit the free flow of the bisulphide of carbon through S despite the exclusion of C^2, the faucets $a^1a^2a^3a^n$ must be two-way cocks; in one position they connect S with b; in the other they close b and leave the passage through S open.

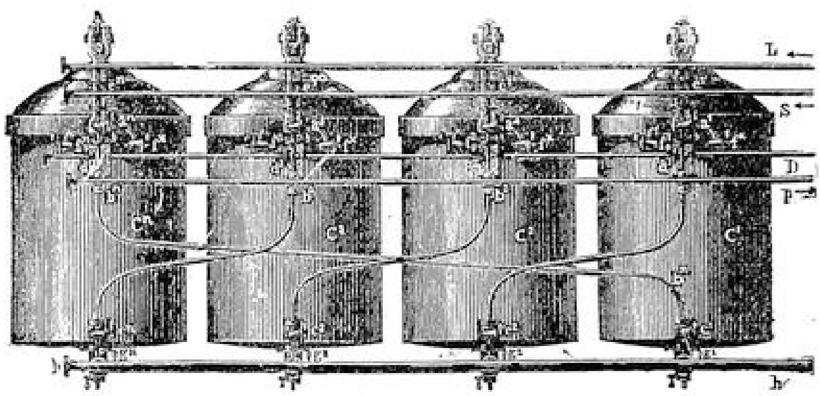

FIG. 24.

In order to collect the bisulphide of carbon present in the extracted residue in C^2, faucet g^2 is opened and the bisulphide of carbon allowed to escape through h. The faucet e^2 in tube L on being opened admits compressed air to C^2, thus hastening the outflow. If nothing escapes below, faucets f^2 and f^x are opened, steam enters through tube D between jacket and cylinder; the bisulphide of carbon vapor passes through g^2 and h into the worm. After the expulsion of the bisulphide of carbon, C^3 is emptied, refilled, connected with C^1, and bisulphide of carbon admitted from C^3 in the manner above described.

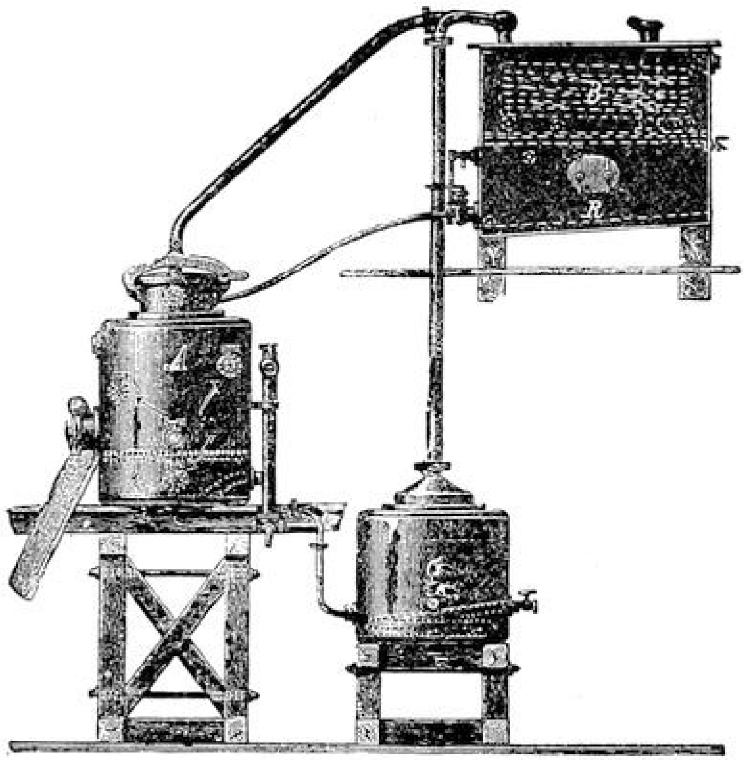

Fig. 25.

An extraction apparatus which has been much recommended of late is the so-called “Excelsior Apparatus” made by Wegelin and Huebner, Halle a. S., which can be worked with any desired solvent. The construction of the apparatus (Figs. 25 and 26) is as follows.

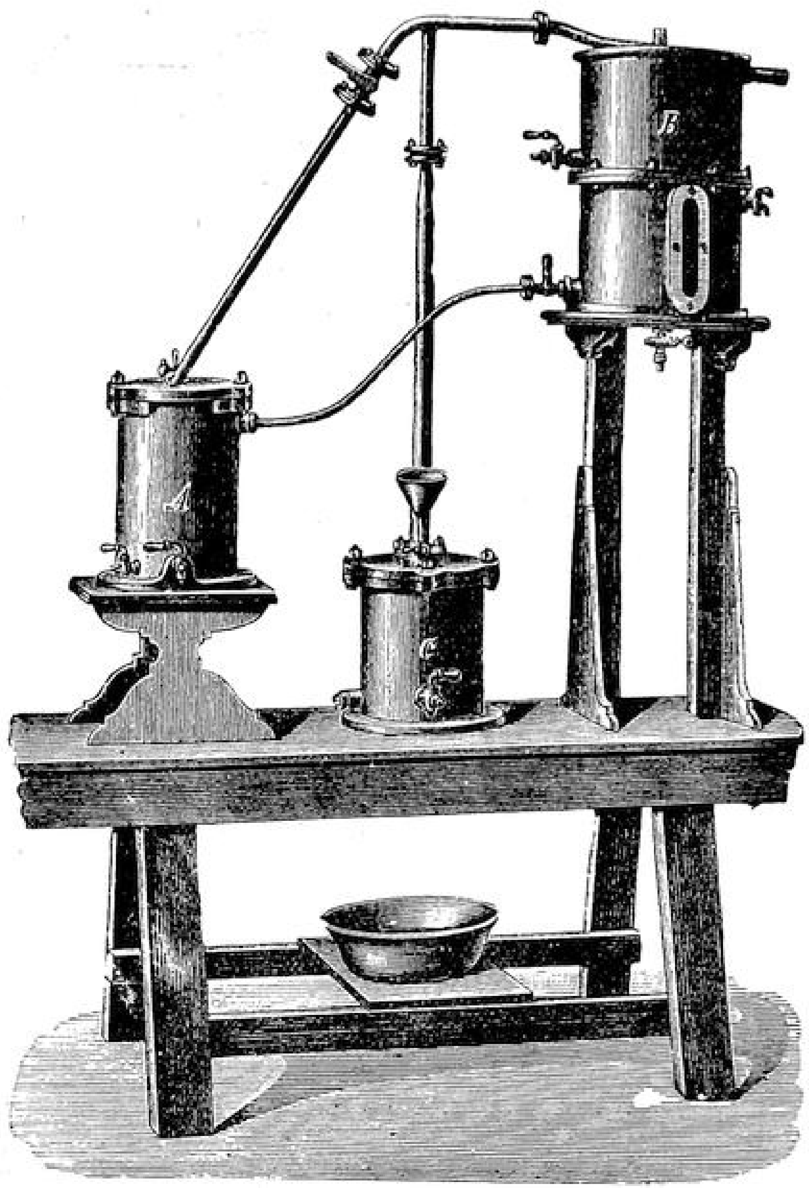

Fig. 26.

The solvent is admitted to the reservoir R in the lower part of the condenser B through the tube indicated in the figure. The material to be extracted having been filled into the cylinder A through the manhole, the apparatus is closed. The cold water is admitted to the condenser by opening a faucet. The three-way cock shown in Fig. 25 is so placed as to open a communication of the overflow tube with A. The faucet at the lower end of the reservoir R is now opened sufficiently and the solvent passes into A from above, and as it descends takes up more and more oil, flows through the sieve-plate, and escapes through the tube at the bottom of A through the three-way cock, the overflow tube, and the drain tube into the accumulator C. The opening of a faucet now admits steam to the heating

coil, when the solvent evaporates, leaving the oil or fat behind. It is condensed in B, again returns to R, whence it passes once more through the faucet into the extractor A. The vessel C and the tubes leading to A and C are surrounded with felt to prevent loss of heat. A sample taken from the small cock at the foot of A (it has a small plate in the interior of the tube) will show when the extraction in A may be looked upon as finished. The solvent is distilled off or recovered from the residue in A in the following manner. First the faucet in R is closed. The three-way cock A is set to establish direct communication between A and C, thus cutting off the overflow tube. Hence all the solvent in A flows into C for distillation, while the oil is left behind. Steam being admitted to the residue, the solvent rises as vapor through the upper tube from A to B and collects in a liquid state in R. To drive off the last traces of the solvent from the fat or oil obtained, steam is blown into C by opening the valve. Besides the solvent, watery vapor enters B and forms a layer of water in R under the solvent. By taking a sample from the test-cock of the reservoir C which has an internal small plate, the termination of the process is ascertained. The gauge tube at the reservoir shows the level of the solvent and water. The water is drawn off by opening the faucet at the lower end of the reservoir. A is emptied through the manhole and by draining the oil from C through the discharge cock. The tube R is closed by a light valve so as to prevent evaporation of the solvent. All the apparatuses work without pressure so that there is no danger from overstrain.

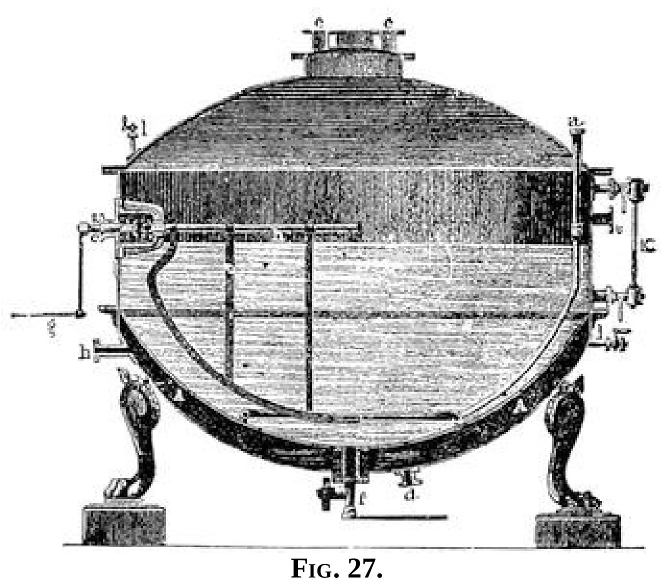

FIG. 27.

The solutions of the essential oils in bisulphide of carbon are distilled off in the steam still illustrated in Fig. 27; the steam enters at *h*, the water of condensation escapes at *d*, the liquid to be distilled enters at *e* from a container at

a higher level. The boiling is kept uniform by the stirring arrangement *hg*. After the bisulphide of carbon is distilled off, air is passed through the oil by the curved tube *a* which has fine perforations, so as to evaporate the last traces of the solvent.

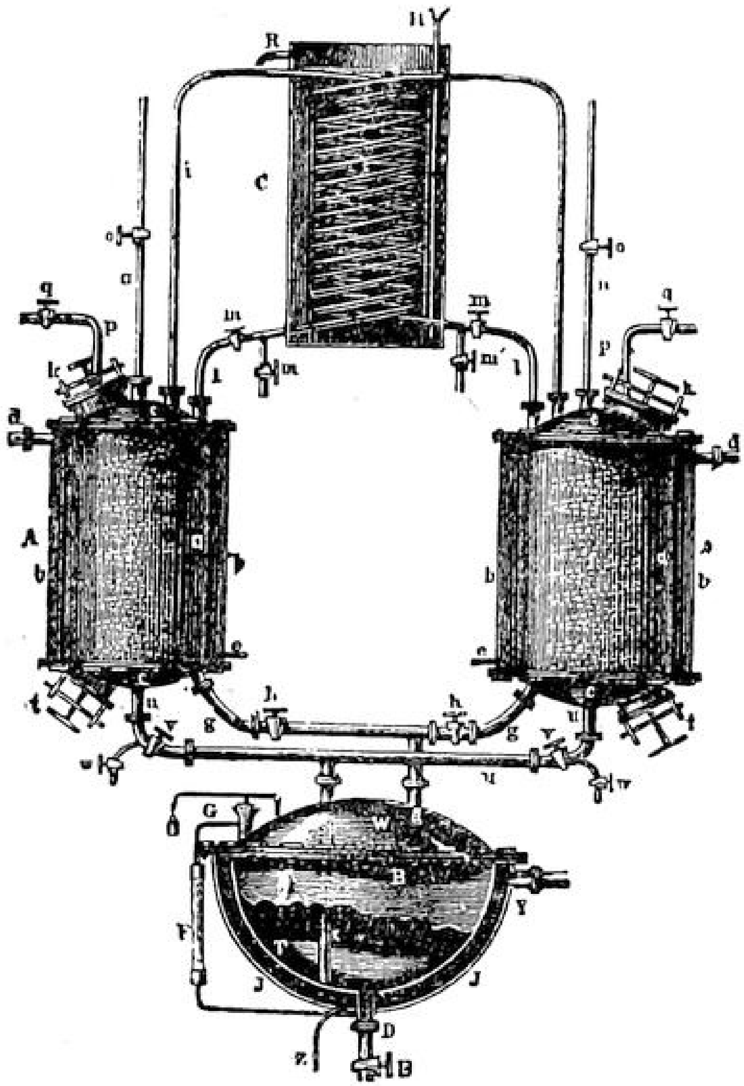

FIG. 28.

In Vohl's apparatus (Fig. 28), arranged for petroleum ether, the extraction is effected with the boiling fluid; hence this apparatus is better adapted for the cheaper oils than for the finest oils from flowers. The apparatus consists of two extractors A A, the accumulator B, and the condenser C. Petroleum ether is allowed to flow over the substances to be extracted, by opening the faucets *mm*, *vh*, closing *ogw*E, and opening *o*, the course being through *ux* to B. When B is two-thirds full, the flow of petroleum ether is cut off, steam is admitted through *y* and the contents of B are brought to the boiling-point. The vapors pass through

g and are condensed in *f* until the contents of A reach the boiling-point of the solvent, when the vapors pass through *i* into C, and after closing *m´* the liquid passes through *ml* into the inner cylinder of the extraction apparatus and returns through *uxx*.

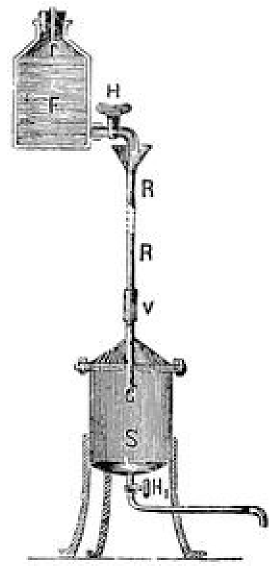

FIG. 29.

After the contents of A are extracted, *m´* is opened, *m* closed, and steam is admitted through *d* into the jacket of A; the vapors of the solvent force the liquid part of the contents through *ux* into B. Overfilling of B is prevented by allowing the vapors of the solvent to escape at the proper time into the condenser through *p* by opening *q*. Then *v* is closed, *q* opened, and the steam present in A drawn off by an exhaust applied to *p*; as soon as *p* begins to cool, all the petroleum ether is distilled off, the steam is cut off at *d*, and the extract evacuated through *t*. The contents of B are brought into a still through D and E.

By employing greater pressure the extraction can also be effected by what is called displacement; the material to be extracted is placed in a stout-walled vessel S (Fig. 29) which is connected by a narrow tube at least ten yards long with the vessel F containing the solvent. Stopcock H is first opened, then stopcock H_1 which is closed as soon as fluid begins to flow from it. After the liquid has remained in contact with the material for from thirty to sixty minutes, H_1 is opened very slowly, the liquid is allowed to escape and is displaced with water which is made to pass out of F in the same way as the solvent, until the latter is completely displaced from S.

After the solvent has been distilled off, the less volatile essential oil remains in the still almost pure, containing only traces of wax, vegetable fat or coloring matter which are of no consequence for our purposes. The last remnants of the solvent cannot be expelled by distillation, but by forcing through the essential oil a current of pure air for fifteen or twenty minutes. The essential oils then are of the purest, unexceptionable quality.

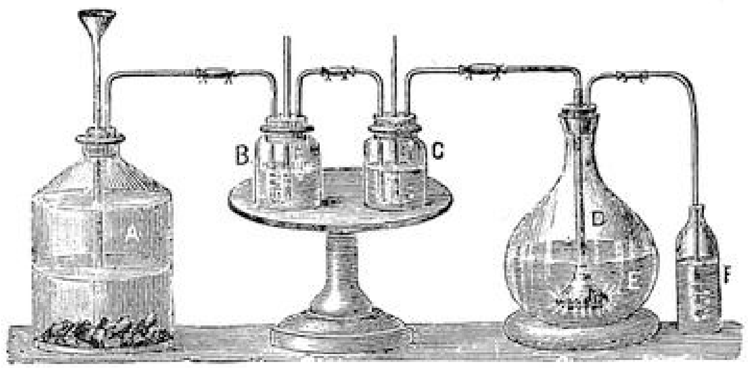

FIG. 30.

In the case of delicate oils it is better to use carbonic acid in place of air for expelling the last traces of the solvent, as the oxygen may impair the delicacy of the fragrance. For this purpose we use the apparatus illustrated in Fig. 30. In the large bottle A carbonic acid is generated by pouring hydrochloric acid over fragments of white marble. The carbonic acid passes into the vessel B filled with water which frees it from any adhering drops of hydrochloric acid; then into C filled with sulphuric acid to which it yields its water so that only pure carbonic acid escapes through the fine rose at the end of tube D which is made of pure tin, and as it passes through the oil in E it carries off the last traces of the volatile solvent. In its final passage through the water in F it leaves behind any oil that may have been carried with it.

As all the aromatic substances change in air by the gradual absorption of oxygen, and lose their odor—become resinified—these costly substances must be put into small bottles which they completely fill, and be preserved in a cool dark place, as light and heat favor resinification. The bottles must be closed with well-fitting glass stoppers.

Aromatic waters or eaux aromatisées, such as jasmine water (eau de jasmin), orange-flower water (eau de fleurs d’oranges, eau triple de Néroli, aqua naphæ triplex), etc., are made by distillation of these flowers with water and show a faint but very fine odor. When they contain, besides, dilute alcohol they are

called spirituous waters or esprits. Those brought into commerce from southern France are of excellent quality.

The Yield of Essential Oils.

The quantities of essential oil obtainable from the vegetable substances vary with the amount present in each. The following table shows the average quantities of oil to be obtained from 100 parts of material.

Material.	Name of Plant.	Mean Yield per 100 Parts.
Ajowan seed	Ptychotis Ajowan	3·000
Alant root	Inula Helenium	0·600
Allspice	Myrtus Pimenta	3·500
Almonds, bitter	Amygdala amara	0·400-0·700
Angelica seed	Archangelica officinalis	1·150
Angelica root, Thuring.	Archangelica officinalis	0·750
Angelica root, Saxon	Archangelica officinalis	1·000
Anise seed, Russian	Pimpinella Anisum	2·800
Anise seed, Thuring.	Pimpinella Anisum	2·400
Anise seed, Morav.	Pimpinella Anisum	2·600
Anise seed, Chili	Pimpinella Anisum	2·400
Anise seed, Spanish	Pimpinella Anisum	3·000
Anise seed, Levant	Pimpinella Anisum	1·300
Anise chaff	Pimpinella Anisum	0·666
Arnica flowers	Arnica montana	0·040
Arnica root	Arnica montana	1·100
Asafœtida	Ferula Asafœtida	3·250
Avens root	Geum urbanum	0·040
Basilicum herb, fresh	Ocymum basilicum	0·040
Bay leaves	Pimenta acris	2·300-2·600
Bear’s berry	Uva ursi	1·010
Beech tar	Betula alba	20·000
Bergamots		ab. 3·400
Betel leaves	Piper Betle	0·550

Bitter almond meal	Amygdala amara	0·950
Buchu leaves	Barosma crenulata	2·600
Butter-bur oil	Tussilago Petasites	0·056
Calamus root	Acorus Calamus	2·800
Camomile, German	Matricaria Chamomilla	4·000-6·000
Camomile, Roman	Anthemis nobilis	3·000
Caraway seed,		
Cult. German	Carum Carvi	4·000
Cult. Dutch	Carum Carvi	5·500
Cult. East Prussian	Carum Carvi	5·000
Cult. Moravian	Carum Carvi	5·000
Wild German	Carum Carvi	6·000-7·000
Wild Norwegian	Carum Carvi	6·000-6·500
Wild Russian	Carum Carvi	3·000
Cardamoms, Ceylon	Elettaria Cardamomum	4·250
Cardamoms, Madras	Elettaria Cardamomum	4·300
Cardamoms, Malabar	Elettaria Cardamomum	1·750
Cardamoms, Siam	Elettaria Cardamomum	1·350
Carrot seed	Daucus Carota	1·650
Cascarilla bark	Croton Eluteria	1·500
Cassia flowers	Cinnamomum Cassia	3·500
Cassia wood	Cinnamomum Cassia	0·285
Cedar wood	Juniperus virginianus	0·700-1·000
Celery herb	Apium graveolens	0·200
Celery seed	Apium graveolens	0·300
Chekan leaves	Myrtus Chekan	1·000
Cinnamon, Ceylon	Cinnamomum zeylanicum	0·900-1·250
Cinnamon, white	Canella alba	1·000
Cloves, Amboina	Caryophyllus aromaticus	19·000
Cloves, Bourbon	Caryophyllus aromaticus	18·000
Cloves, Zanzibar	Caryophyllus aromaticus	17·500
Cloves, stems	Caryophyllus aromaticus	6·000
Common wormwood herb	Artemisia Abrotanum	0.040

Common wormwood root	Artemisia Abrotanum	0·100
Copaiva balsam, Para	Copaifera officinalis	45·000
Copaiva balsam, East Ind.	Dipterocarpus turbinatus	65·000
Coriander seed,		
Thuringian	Coriandrum sativum	0·800
Russian	Coriandrum sativum	0·900
Dutch	Coriandrum sativum	0·600
East Indian	Coriandrum sativum	0·150
Italian	Coriandrum sativum	0·700
Mogadore	Coriandrum sativum	0·600
Crisp mint herb	Mentha crispa	1·000
Cubebs	Piper Cubeba	12·000-16·000
Culilaban bark	Laurus Culilavan	3·400
Cumin seed, Mogadore	Cuminum Cyminum	3·000
Cumin seed, Maltese	Cuminum Cyminum	3·900
Cumin seed, Syrian	Cuminum Cyminum	4·200
Cumin seed, East Indian	Cuminum Cyminum	2·250
Curcuma root	Curcuma longa	5·200
Dill seed, German	Anethum graveolens	3·800
Dill seed, Russian	Anethum graveolens	4·000
Dill seed, East Indian	Anethum Sowa	2·000
Elder flowers	Sambucus niger	0·025
Elemi resin	Icica Abilo	17·000
Eucalyptus leaves, dry	Eucalyptus globulus	3·000
Fennel seed,		
Saxon	Foeniculum vulgare	5·000-5·600
Galician	Foeniculum vulgare	6·000
East Indian	Foeniculum Panmorium	2·200
Galanga root	Alpinia Galanga	0·750
Galbanum resin	Galbanum officinale	6·500
Geranium	Pelargonium odoratissimum	0·115
Ginger root,		
African	Zingiber officinale	2·600

Bengal	Zingiber officinale	2·000
Japan	Zingiber officinale	1·800
Cochin China	Zingiber officinale	1·900
Hazel root	Asarum europæum	1·100
Heracleum seed	Heracleum Sphondylium	1·000
Hop flowers	Humulus Lupulus	0·700
Hop meal, lupulin	Humulus Lupulus	2·250
Hyssop herb	Hyssopa officinalis	0·400
Iva herb	Iva moschata	0·400
Juniper berries,		
German	Juniperus communis	0·500-0·700
Italian	Juniperus communis	1·100-1·200
Hungarian	Juniperus communis	1·000-1·100
Laurel berries	Laurus nobilis	1·000
Laurel leaves	Laurus nobilis	2·400
Laurel, Californian	Oreodaphne californica	7·600
Lavender flowers,		
German	Lavandula vera	2·900
Linaloe wood	Elaphrium graveolens	5·000
Lovage root	Levisticum officinale	0·600
Mace	Myristica fragrans	11·000-16·000
Marjoram herb, fresh	Origanum Majorana	0·350
Marjoram herb, dry	Origanum Majorana	0·900
Marsh-rosemary oil	Ledum palustre	0·350
Massoy bark	Massoia aromatica	
Masterwort root	Imperatoria Ostruthium	0·800
Matico leaves	Piper angustifolium	2·400
Matricaria herb	Matricaria Parthenium	0·030
Melissa herb	Melissa officinalis	0·100
Michelia bark	Michelia nilagirica	0·300
Milfoil herb	Achillea Millefolium	0·080
Musk seed	Hibiscus Abelmoschus	0·200
Mustard seed,		

Dutch	Sinapis nigra	0·850
German	Sinapis nigra	0·750
East Indian	Sinapis nigra	0·590
Pugliese	Sinapis nigra	0·750
Russian	Sinapis juncea	0·500
Myrrh	Balsamodendron Myrrha	2·500-6·500
Myrtle	Myrtus communis	0·275
Nigella seed	Nigella sativa	0·300
Nutmegs	Myristica fragrans	8·000-10·000
Olibanum resin	Boswellia, var. spec	6·300
Opoponax resin	Pastinaca Opoponax	6·500
Orange peel, sweet	Citrus Aurantium	2·500
Orris root	Iris florentina	0·200
Parsley herb	Apium Petroselinum	0·300
Parsley seed	Apium Petroselinum	3·000
Parsnip seed	Pastinaca sativa	2·400
Patchouly herb	Pogostemon Patchouly	1·500-4·000
Peach kernels	Amygdalus persica	0·800-1·000
Pellitory root	Valeriana celtia	1·000
Pepper, black	Piper nigrum	2·200
Peppermint, fresh	Mentha piperita	0·300
Peppermint, dry	Mentha piperita	1·000-1·250
Peru balsam	Toluifera Pereiræ	0·400
Pimpernel root	Pimpinella saxifraga	0·025
Poplar sprouts	Populus niger	0·500
Rhodium wood	Convolvulus Scoparius	0·050
Rose flowers, fresh	Rosa centifolia	0·050
Rosemary	Rosmarinus officinalis	1·550
Rue herb	Ruta graveolens	0·180
Sage herb, German	Salvia officinalis	1·400
Sage herb, Italian	Salvia officinalis	1·700
Santal wood,		
East Indian	Santalum album	4·500

Macassar	Santalum album	2·500
West Indian	Unknown	2·700
Sassafras wood	Sassafras officinalis	2·600
Savin herb	Juniperus Sabina	3·750
Snakeroot, Canadian	Asarum canadense	2·800-3·250
Snakeroot, Virginian	Aristolochia Serpentaria	2·000
Star-anise, Chinese	Illicium anisatum	5·000
Star-anise, Japanese	Illicium religiosum	1·000
Storax	Liquidambar orientalis	1·000
Sumbul root	Ferula Sumbul	0·300
Tansy herb	Tanacetum vulgare	0·150
Thyme	Thymus Serpyllum	0·200
Thyme dry	Thymus Serpyllum	0·100
Valerian root, German	Valeriana officinalis	0·950
Valerian root, Dutch	Valeriana officinalis	1·000
Valerian root, Japan	Patrinia scabiosæfolia	
Vetiver root	Andropogon muricatus	0·200-0·350
Violet flowers	Viola odorata	0·030
Water-yarrow seed	Phellandrium aquaticum	1·300
Wintersweet marjoram	Origanum creticum	3·500
Worm seed	Artemisia maritima	2·000
Wormwood herb	Artemisia Absinthium	0·300-0·400
Zedoary root	Curcuma Zedoaria	1·300

Fresh flowers as a rule contain more aromatic material than wilted ones; the yield of dried herbs, leaves, etc., is usually greater than that of the fresh, because the latter contain much water which is lost in drying. When such vegetable materials cannot be worked fresh, which is best, they should be completely dried, spread on boards, at a moderate temperature in the shade and preserved in dry airy rooms, special care being had to guard against mould.

CHAPTER VIII.
THE SPECIAL CHARACTERISTICS OF AROMATIC SUBSTANCES.

In a preceding chapter on the chemical properties of the vegetable substances many of their characteristics have been described. In this place we need only describe the physical properties of the essential oils, and with some of them to lay stress on those peculiarities by which they are specially differentiated. This knowledge is of the greatest importance to the manufacturer of perfumery because no single individual is in a position to prepare all aromatic substances himself, but must rely on commerce for some of them; and in no group of chemicals is adulteration as frequent and as difficult of demonstration as among the aromatics. These adulterations are carried so far that many essential oils occurring in commerce under certain names often have nothing in common with the substance for which they are sold but the name.

Oil of Cassie.

The oil of Acacia farnesiana is greenish-yellow and viscid; the density and boiling-point, which are of the greatest importance with reference to the genuineness of an essential oil, are not yet accurately known. Moreover, this oil never occurs in commerce as such, but its odor is present in perfumes, fixed oils, and pomades.

Oil of Anise

should be colorless or faintly yellow; a dark yellow color indicates old and inferior quality. The characteristics of this oil are the odor, its aromatic sweet taste, and especially the property of solidifying at a comparatively high temperature, 10-15° C. (50-59° F.), which is due to the separation of a stearopten, anethol. Oil of anise is frequently adulterated with or replaced by oil of star-anise. The easy solidification of the oil of anise is not always proof of its good quality, for the oil from anise chaff, which congeals at a still higher temperature, is sometimes mixed with it, and this has a less fine odor than that distilled from the seed. One part by weight of oil of anise is soluble in an equal weight of alcohol of 94%.

Oil of Bergamot

has a pale yellow color which becomes greenish when the oil is kept in copper vessels, and a strong agreeable odor. This oil requires the greatest care in its preservation, as it abstracts oxygen from the air with extreme rapidity, when it changes its superior odor so that it can hardly be distinguished from oil of turpentine.

Oil of Bitter Almond (Oleum Amygdale Amaræ),

when pure, is a colorless, refractive liquid which is heavier than water. The vessels in which this product is preserved must be stoppered air-tight, for in the air the oil very quickly changes into a white, odorless mass of crystals consisting of benzoic acid.

Oil of bitter almond is formed by the action of the amygdalin upon the emulsin present in the fruit, bitter-almond meal being deprived of fat and left in contact with water for some hours at from 40-45° C. (104-113° F.). Besides oil of bitter almond, sugar and prussic acid are likewise formed. The crude oil distilled from the meal is freed from the prussic acid by agitation with ferrous chloride and lime-water, and redistillation.

Oil of Cajeput (Oleum Cajuputi)

has usually a greenish color, and has a burning, camphoraceous and at the same time cooling taste. It has a peculiar odor resembling that of camphor and rosemary.

Oil of Calamus (Oleum Calami).

This oil, which is very viscid and of a yellow or reddish color, must usually be mixed with other essential oils in order to furnish pleasant perfumes.

Oil of Chamomile (Oleum Chamomillæ).

Oil of chamomile, from Matricaria Chamomilla (common chamomile), which is specially characterized by its magnificent dark-blue color, has a marked narcotic odor and is very high-priced, owing to the small yield of oil by the flowers. The oil from Anthemis nobilis (Roman chamomile) has also a blue color which gradually becomes greenish-yellow.

Camphor (Camphora).

This essential oil differs from the others mainly by being firm and crystalline at ordinary temperatures. Chinese or Japanese camphor melts at 175° C. (347° F.) and boils at 205° C. (401° F.). Camphor is seldom used alone, as its odor is hardly fragrant; but it finds frequent application in the preparation of mouth washes, toilet vinegars, etc. In commerce so-called Borneo camphor is also met with (though rarely), which closely resembles the Chinese in appearance and other qualities, but is more friable and melts at 189° C. (388·4° F.).

Oil of Cascarilla

is not used pure in perfumery, the bark being generally employed instead.

Oil of Cassia (Oleum Cassiæ)

has a yellow color, gradually becoming dark reddish-brown, and an odor resembling that of oil of cinnamon, but the odor is not so fine, nor so strong, as that of the latter. The taste of the oil is of special importance: while that of true oil of cinnamon is burning though sweet, oil of cassia has a sharper taste, and this taste is considered by some a good mark of recognition of the rather common adulteration of true oil of cinnamon which is much more costly.

Oil of Cedar.

This oil, obtained from the wood of the Juniperus virginiana (not from the true cedar, Cedrus Libani), is clear like water, has a pleasant odor, and differs from most essential oils by congealing at a very low temperature (-22° C. or-8° F.) and by its uncommon resinification in contact with air.

Oil of Citron.

Oil of citron is usually merely a synonym for “oil of lemon.” But in perfumery it has been customary to designate the oil of lemon which was extracted by the écuelle process, as “oil of citron-zeste” or “oil of citron,” while “oil of lemon” meant the distilled oil. Since there is no difficulty at the present time in obtaining all the hand-pressed oil that may be required, and of the finest quality, there is no longer any necessity for making the before-mentioned distinction.

Oil of Lemon (Oleum Limonis, Oleum Citri)

is one of the most important essential oils for the perfumer as well as the manufacturer of liqueurs, confectioner, etc. The oil is pale yellow, and of a very strong refreshing odor which it loses rapidly in contact with the air, when it acquires a disagreeable odor of turpentine and gradually resinifies. This change is particularly marked under the influence of light. Its spec. grav. is 0·850 at 20° C. (68° F.). It is soluble in an equal volume of strong alcohol or glacial acetic acid. The hand-pressed oil has a much finer aroma than that obtained by distillation.

Oil of Citronella.

This oil is hardly ever made in Europe, since it is imported in excellent quality and at low prices from India and especially the island of Ceylon. (See above, p. 29.)

Oil of Lemon-Grass.

This oil, which is imported in considerable quantities from India (chiefly Ceylon), is colorless and possesses a very pleasant odor of lemon which at the same time recalls that of roses and still more that of geranium, which is not rarely adulterated with it. (See above, p. 33.)

Oil of Coriander (Oleum Coriandri)

has a pale yellow color and a burning, sharp, aromatic taste. Like oil of cubebs (oleum cubebæ), oil of dill (oleum anethi), and oil of fennel (oleum fœniculi) which latter also has a rather low congealing point (-8° C. or +17° F.), this oil is used less in perfumery than for scenting soap and in the manufacture of liqueurs. But it should be noted that these oils, as well as those of bergamot, caraway, star-anise, and some others, could well be employed for cheap perfumes and for scenting soap. Oil of dill also finds application alone in the preparation of some face washes, and the dried fennel herb in cheap sachets.

Oil of Lilac

can be made at slight cost from the flowers, as the raw material is obtainable without much trouble; it forms a yellow, strong-scented oil. In perfumery, however, use is generally made only of the pomade made from the fresh flowers or the alcoholic extract prepared from it. Or else the odor is imitated by means of terpineol, which is now on the market under the name of lilacin.

Oil of Geranium.

It is necessary to distinguish clearly between oil of true geranium distilled in Southern France and Algiers from species of Pelargonium; and Turkish oil of geranium, also known as Palmarosa oil, oil of geranium grass, oil of Rusa grass, etc., which is distilled in India from ginger grass. (See above, p. 33.)

The first-mentioned oil has a much finer aroma than the second. The two oils are frequently confounded, even in prominent works of reference.

When oil of geranium or of rose geranium is directed to be used, the French (or Algerian, or Spanish) oil should be employed. These cost more than twice as much as the so-called Turkish or palmarosa oil.

Oil of Heliotrope.

This oil which does not yet occur in commerce (we find merely the pomade and the alcoholic extract of the latter) has been made by the author experimentally; the most suitable method was found to be extraction with petroleum ether. As the plant, Heliotropium peruvianum, the source of this

delightful odor, is frequently cultivated in our gardens, the preparation of the oil by this method is to be recommended, being less expensive and more rapid than by the use of fat, while the product obtained with petroleum ether is as fine as that extracted by alcohol from the pomade.

Oil of Elder (Oleum Sambuci).

The remark made under the head of oil of lilac applies equally to this oil. For the benefit of those who wish to make this oil in its pure form we may add that it is absolutely necessary to select only the freshest flowers, otherwise the odor will be very much impaired.

Oil of Jasmine,

not to be confounded with the oil of Syringa or German jasmine (Philadelphus coronarius), is colorless or yellowish and has a very strong, almost narcotic odor. It is one of the most valuable and at the same time most expensive aromatic substances employed in perfumery. Genuine oil of jasmine can be obtained only from Southern France at very high prices. What is usually sold as “oil of jasmine” is a fixed oil impregnated with the aroma of jasmine.

Oil of Cherry-Laurel

is not used as such in perfumery; at most cherry-laurel water may be employed. But as this has the odor of oil of bitter almond and as the presence of some prussic acid, on account of which the officinal cherry-laurel water is used, is of no value to the perfumer and is, in fact, undesirable, owing to its poisonous quality, we substitute in all cases a corresponding quantity of oil of bitter almond for cherry-laurel water.

Oil of Culilaban (Oleum Culilavani)

is light brown, somewhat viscid; the odor recalls that of the oils of cinnamon, sassafras, and clove. It has been used for scenting soap.

Oil of Caraway (Oleum Cari)

is light yellow and has an aromatic odor and burning taste. In perfumery it is used only for very cheap odors and for scenting soap; it finds its chief application in the manufacture of liqueurs.

Oil of Lavender (Oleum Lavandulæ).

This oil is of great importance to the perfumer and is imported in unsurpassed quality from England (Mitcham); it is light yellow, has a burning sharp taste, and is exceedingly sensitive to light and air, under the action of which it loses its refreshing odor in a very brief time and acquires a common smell recalling that of turpentine.

The buyer of this oil should take care to secure the true oil of lavender (from Lavandula vera); for the oil of spike-lavender is sold under the same name. This, prepared from Lavandula Spica, has a similar odor to the genuine, but cannot be compared with it in delicacy. For this reason, too, the difference in the price between the two is considerable. True English oil of lavender costs ten times as much as oil of spike-lavender. The English brand of the true oil is of so excellent a quality that it brings four or five times as much as the best French oil, which is sold under the name of huile de lavande des Alpes. Yet during the last decade or so the French oil of lavender flowers has become so much improved in quality that it has become a serious rival to the Mitcham oil.

Oil of Wallflower

made from the flowers of the well-known garden plant, and

Oil of Lily

likewise from the ornamental plant, are, strange to say, not manufactured in any place, to our knowledge. Experiments made by us in this direction prove that the odors of these plants can be obtained either by absorption or, more readily, by extraction. The perfumes thus far occurring under these names are always combinations of different scents which, though pleasant, have but little in common with the plants whose names they bear.

In this connection we may say that the perfumes sold under the names of various flowers often have no relation to them, but are mixtures of various odors. While it cannot be denied that perfumes may be made in this manner which resemble those of the respective plants, it is unquestionably an imperfection in the art of perfumery that these odors are not really made from the flowers mentioned. To give another characteristic instance, we may add that the delightful odor of the well-known lily of the valley (Convallaria majalis)—a plant which grows wild abundantly in many of our forests—has not yet been

produced, and that even imitations of this odor, which in delicacy and fragrance stands next to those of the rose and violet, are seldom met with in commerce.

Oil of Lemon (Oleum Limonis),

obtained from the fruits of the lemon-tree, is one of the most important products, both statistically and economically, of the Citrus family. In German works there is often a confusion between “oil of citron” and “oil of lemon,” it being supposed by the authors that the “Citronen-öl” is derived from the citron (Citrus medica), and the “Limonen-öl” from the lemon (Citrus Limonum). There is, indeed, some oil made, occasionally, from the citron, but it does not figure in price-lists. The oil of the lemon, on the other hand, is very commonly called “Citronen-öl,” and the fruit itself “Citrone.” Hence, when “Citronen-öl” is quoted in a formula, it may be assumed at once that oil of lemon is intended. It is very liable to resinify, when it loses its fragrance.

Oil of Sweet Bay (Laurel) (Oleum Lauri)

is green, and usually mixed with the fixed oil of the same plant. It finds more frequent application in the manufacture of liqueurs than in perfumery; but as it has a pleasant odor it might well be used for cheap perfumes. But in that event it must be freed from the fixed oil by distillation.

Oil of Magnolia,

likewise, has not yet been prepared as such. The remarks made above under the head of oils of lily and wallflower apply also to this odor. The so-called magnolia perfumes are mixtures of different odors.

Oil of Marjoram (Oleum Majoranæ).

Oil of marjoram, which is obtained by distillation from the dried herb, has a strong aromatic odor. It is mentioned as having often been used in perfumery for scenting soap instead of oil of thyme, whose odor, moreover, is very similar to that of marjoram, but this is a mistake, due to the fact that ordinary oil of thyme has long been sold under the name of oil of origanum. True oil of marjoram costs about twelve dollars a pound, while oil of thyme (so-called oil of origanum) is worth only about eighty cents. It is rarely employed for volatile perfumes.

Oil of Melissa.

The oil of Melissa officinalis, owing to the very small yield, is quite expensive. It is used only for the preparation of some perfumes which owe their peculiar qualities to this strong odor. This oil must not be confounded with the spurious oil of melissa, also called oil of citron-melissa, which is identical with oil of lemon grass (see page 30).

Oils of Mint.

Although all the mints possess an agreeable odor, only three varieties find extensive application. There are the oils from Mentha piperita, peppermint; Mentha viridis, spearmint; and Mentha crispa, crispmint. The oils of English manufacture are highly esteemed, but the United States also produces them of excellent quality. At one time the cultivation of mints, particularly peppermint, was greatly extended, with the expectation of deriving satisfactory profit from the enterprise. It has, however, been conclusively shown that the market cannot absorb more than a certain quantity of these products; and that any over-production brings loss and disappointment to the investor. Beside the three kinds of mint above mentioned, there is another species, Mentha arvensis, a native of Japan, which is extensively cultivated there, and is the chief source of the menthol of commerce, so well known as an efficient remedy for neuralgia, migraine, etc., in form of menthol cones. The three varieties of the mint oils previously mentioned are distinguished, aside from their pleasant odor, by the property of leaving a very refreshing and cooling taste in the mouth, and for this reason they form the most important constituent of all fine mouth washes.

True oil of peppermint, Oleum Menthæ piperitæ, when pure is colorless, very mobile, of a burning sharp taste which is followed by a peculiar coolness. The commercial product is usually pale green. Oil of crispmint, Oleum Menthæ crispæ, which in Europe is often sold to novices as oil of peppermint, has always a more or less yellow color and resembles the oil of peppermint in its properties, but it is less fine and cheaper. The same is true of the oil of spearmint, but this has a very characteristic odor and taste, distinctly different from peppermint.

As above stated, the oils of mint are extensively used for mouth washes, also for scenting soap, in liqueurs and pastils, but rarely in handkerchief perfumes.

Oils of Mace and Nutmeg (Oleum Macidis and Oleum Myristicæ).

These oils are prepared either from the seed coat (Oleum Macidis) or the nutmeg itself (Oleum Myristicæ). Oil of mace generally has a yellowish-red color in tint varying from dark to light and even colorless. Its taste is agreeable and mild and the odor exceedingly strong. Like oil of nutmeg, it is extensively used in the manufacture of liqueurs and for scenting soap. The oil prepared by distillation from the nutmeg is, when fresh, almost colorless or at most faintly yellow, of a burning sharp taste, and an aromatic odor. Like oil of mace, it is used in the manufacture of liqueurs and soaps and also in many perfumes.

In India a third valuable product is obtained from the nutmeg by expression of the ripe fruits and is called nutmeg butter. This is bright yellow and consists of a true fat and an essential oil. Its odor is very pleasant and a very superior soap can be made by saponification of this valuable product with soda lye.

Oil of Myrtle.

This oil is of a greenish color and very mobile, but it is not a commercial product; the manufacturer must prepare the oil himself from the leaves, though the yield is small. The articles sold as so-called essence of myrtle are always mixtures of different odors. Southern France, however, exports at high prices a myrtle water (eau des anges) which is really made by distillation of the leaves with water.

Oil of Narcissus.

As to the odor to which this flower owes its fragrance we may repeat what we have said just now with reference to the oil of myrtle: we have never succeeded in obtaining this oil in commerce. The so-called essence of narcissus, though a very pleasant mixture, contains no trace of the true oil. As to

Oil of Pink,

the same remark applies: the compositions sold under the name of essence d'œillet, however, have a very striking odor of pink.

Oil of Clove (Oleum Caryophylli).

This oil when fresh is colorless, but soon becomes yellowish or brown. It is heavier than water in which it sinks and is characterized by an exceedingly strong burning taste and a spicy odor. It remains at least partly fluid at a very low

temperature, namely,-20° C. (-4° F.).

Oil of Orange Flowers (Oleum Naphæ, Oleum Neroli),

commercially known also under the French names huile de fleurs d'oranges, huile néroli, huile néroli pétale, is obtained from the flowers of the orange-tree in Southern France, where the orange is specially planted for this purpose. The odor of the oil varies with the mode of its preparation; that obtained by distillation with water has a different odor from that made by maceration with fat and extraction with alcohol. The latter variety of oil as such, however, is not found in commerce, the alcoholic extract entering at once into the composition of the perfumes.

The French manufacturers of this oil, which is of great importance in perfumery, distinguish several varieties. The most valuable is the oil from the flowers of Citrus vulgaris (or Citrus Bigaradia), the true bitter orange (or Seville orange) tree. This is the so-called néroli bigarade. That called néroli pétale is obtained from the same flowers carefully deprived of their floral envelopes, so that only the petals are subjected to distillation. Much cheaper than these two is the oil of petit grain which is distilled from the leaves and sometimes also unripe fruits of various trees of the Citrus order.

All these oils are among the most delicate; when fresh they are colorless and have a peculiar bitter taste; exposed to light and air they assume a reddish tint and undergo rapid resinification. They should, therefore, be preserved in particularly well-closed vessels in a dark, cool place.

Not to be confounded with these oils is the

Oil of Orange,

of which there are two kinds, one from the bitter orange, known also as Oil of Orange, Bigarade, and the other from the sweet orange, also known as Oil of Portugal. Both are extracted from the peel of the fruit by mechanical means. Both oils of orange peel are golden yellow, and have a pleasant, refreshing odor recalling that of the fruit. They find application for scenting soap, in toilet waters, and in some true perfumes. When oil of orange or oil of orange peel is mentioned in any formula, without further specification, the oil of *bitter* orange peel should be used.

Oil of Patchouly.

This oil, which might be manufactured with advantage in India, the home of the plant, is, strange to say, not imported from that country, but is distilled in Europe from the dried herb. Fresh oil of patchouly is brown in color, very viscid, almost like balsam, and surpasses all other essential oils in the intensity of its odor. Owing to the strong odor, pure oil of patchouly must really be called ill-smelling; only when highly diluted does the odor become pleasant, and then forms a useful ingredient of many perfumes as the fundamental odor in the harmony.

Oil of Syringa.

Oil of false jasmine, from the flowers of Philadelphus coronarius, is not made as such; in Southern France, however, the flowers are frequently used for the preparation of a cheap pomade known commercially as orange-flower pomade. A personal experiment made with the view to obtain the pure odor by extraction of the flowers with petroleum ether has shown that this plant is suitable for making very fine preparations, both handkerchief perfumes and pomades.

Oil of Allspice,

of a burning sharp taste and odor, is colorless, but is hardly ever used for the purposes of the perfumer—at most for soaps—but all the more frequently in the manufacture of liqueurs, and particularly also in that of artificial bay-rum.

Oil of Sweet Pea

has not been made thus far, though there is no doubt that this perfume, too, can be prepared pure from the alcoholic extract of the pomade. The properties of the oil should resemble those of the finest néroli pétale.

Oil of Rue (Oleum Rutæ).

This oil, obtained by distillation of the herb, is colorless or pale yellow, of a very strong, penetrating odor; it is used in some washes, but more particularly as an ingredient in the manufacture of artificial cognac, for which purpose the plant is specially cultivated in France.

Oil of Reseda (Mignonette).

The delightful odor of this plant which formerly could only be fixed by maceration in fat may be readily prepared by extraction with petroleum ether. Yet special precautions should be taken that nothing but portions of the flowers, carefully picked off, and no green leaves are extracted. The oil thus obtained has a yellow color and a disagreeable odor which changes into the well-known pleasant smell of the flower when highly diluted with alcohol.

Oil of Rose (Oleum Rosæ),

also known as attar or otto of rose. The various species of roses give different odors. The commercial Turkish, Persian, and Indian oils of rose (which latter is never exported)—which, by the way, are very generally adulterated even at their point of production—are derived mainly from Rosa damascena, and when highly diluted yield the pleasant odor of our ordinary garden roses. The rose oils having the odor of the moss rose, tea rose, or dog rose are made almost exclusively in France and in commerce do not appear pure but generally in the form of pomades or alcoholic solutions known as essences de roses.

True rose oil is yellowish or yellow, or else greenish, and varying from liquid almost to the consistence of butter. Between these extremes there are all possible gradations. A comparatively very high congealing-point is a characteristic of oil of rose. It becomes almost solid at 14 to 20° C. (57 to 68° F.). The portion separated during solidification is colorless, markedly crystalline, and, strange to say, almost odorless. Pure oil of rose smells disagreeably narcotic, only the very dilute solution shows the incomparable fragrance.

Much superior to the oils of rose which are prepared from rose leaves (either fresh or salted) are those obtained by maceration or extraction with petroleum ether. Those perfumes sold under the name of various species of rose, such as moss rose, etc., are combinations of rose oil with other aromatics.

Oil of Rhodium.

This bright yellow light oil is obtained by distillation of the wood of Convolvulus Scoparius. At times this oil is scarce in commerce. It has a faint but decided odor of rose.

Oil of Rosemary (Oleum Rosmarini).

This oil is obtained by distillation from the herb of the rosemary plant as a

thin, pale green fluid with an aromatic odor and spicy taste. It is used as an ingredient in some old renowned handkerchief perfumes—for instance, Cologne water—also for flavoring soaps and liqueurs.

Oil of Sage (Oleum Salviæ),

from the flowers of Salvia officinalis, is yellowish, with an odor somewhat similar to that of oil of peppermint, but far less intense. Like the latter it imparts a pleasant coolness to the mouth and hence is used in some mouth washes.

Oil of Santal (Oleum Santali).

The oil of santal wood (also called sandal-wood oil) has a thick, honey-like consistence and an agreeable, rose-like odor. Formerly it was sometimes used for the adulteration of oil of rose, but can also very well be used alone for several perfumes and fumigating preparations.

Oil of Sassafras (Oleum Sassafras)

is yellow, spicy, with a burning odor and taste; in the cold it crystallizes only in part. The odor of this oil recalls that of fennel. The purest form of it, or rather substitute for it, is safrol, its main constituent, which is, however, now extracted more economically from crude oil of camphor, in which it likewise forms an ingredient.

Oil of Meadow-sweet (Oleum Spirææ).

Several species of Spiræa, and especially Spiræa ulmaria, furnish very pleasant odors. This oil consists mainly of salicylic aldehyde.

Despite its pleasant odor and the facility of its production, this substance has thus far found little application in perfumery. The natural oil of meadowsweet, owing to its extremely high price, can hardly ever be used.

Oil of Star-Anise (Oleum Anisi Stellati; Oleum Illicii)

resembles in its properties the oil of anise, even in its odor; but all connoisseurs agree that the odor of the oil of star-anise far surpasses that of the oil of anise, hence the former is used especially for fine perfumes. This preference, however, does not extend to all preparations. For certain liqueurs,

such as anisette, the oil obtained from common anise (Saxon anise) is usually preferred. Many also regard the odor of star-anise as inferior to that of fine European anise.

Oils of Thyme (Oleum Thymi).

The essential oils of thyme (chiefly Thymus vulgaris) and some related plants are very frequently used for scenting cheap soaps. The oils of these plants are light yellow, and so similar in odor that it is not possible to distinguish them except by direct comparison.

Oil of Vanilla,

or, more correctly, vanilla camphor, the true odorous constituent of vanilla, also called vanillin, is a crystalline substance with a delightful odor, melting at 76° C. (169° F.). This is now extensively made artificially from the cambium sap of pines, the coniferin being converted by chemical processes into vanillin. One ounce of good vanillin is equivalent to about forty ounces of best Mexican vanilla beans.

Oil of Violet

has thus far been produced in but very small quantities from the alcoholic extract of the true violet pomade; it has a greenish color and when pure a narcotic odor not to be recognized as that of the flower. The pleasant odor of violets manifests itself only in extreme dilution.

Oil of Verbena

is yellow, with a very pleasant odor of lemons. Its price being quite high, it is usually adulterated with oil of lemon-grass, or else the latter is sold under the name of oil of verbena (see p. 30). In fact the odors of the two oils are so similar that they are easily confounded.

Oil of Vetiver (Oleum Ivaranchusæ),

from Andropogon muricatus (see p. 30), is viscid, reddish-brown, with a very strong and lasting odor.

Oil of Wintergreen (Oleum Gaultheriæ).

This product is obtained by distillation from the leaves and twigs of Gaultheria procumbens or else by distilling the bark or leaves of Betula lenta with water, in which case the oil is generated by the action of the water, as it does not pre-exist in the birch, and, moreover, in this case the oil consists of nothing but methyl salicylate. It differs, like oil of meadowsweet, very markedly from the other aromatic substances and mainly consists of a so-called compound ether. It is a salicylate of methyl, boils at 220° C. (428° F.), is much heavier than water (specific gravity 1·173 to 1·184), and dissolves readily in alcohol and other solvents. It is used chiefly for scenting soap; the perfumes sold as wintergreen are usually mixtures of different substances which contain no oil of wintergreen.

Oil of Ylang-Ylang (Oleum Unonæ odoratissimæ)

is imported from Manilla. It is colorless or yellowish, and has a most delightful characteristic odor, which is rather fugitive if not made resistant by other substances. It forms an important constituent of several of the most favorite and expensive essences.

Oil of Hyssop (Oleum Hyssopi)

is colorless, but rapidly becomes yellow in the air. It is used in some very cheap perfumes and in the manufacture of liqueurs.

Oils of Cinnamon (Oleum Cinnamomi).

Commercially we find chiefly three varieties of essential oils which are designated as: oil of Ceylon cinnamon, oil of Chinese cinnamon or oil of cassia, and oil of cinnamon leaves. Oil of Ceylon cinnamon, sometimes called “true oil of cinnamon,” made from the bark of the twigs of the cinnamon laurel and formerly imported mainly from Ceylon but now distilled in large amounts in Germany from imported cinnamon “chips,” is rather viscid, golden yellow to reddish-brown in color, of a burning though sweet taste. In the air it gradually absorbs oxygen, when it becomes dark red, thicker, and of weaker flavor. Oil of Ceylon cinnamon, which should always be used in perfumes or liqueurs when simply “oil of cinnamon” is directed, has a specific gravity of 1·030 to 1·035 at 15° C. (59° F.) and boils at about 240° C. (464° F.). Its chief constituent upon which its aroma depends is cinnamyl aldehyde.

Oil of Chinese cinnamon, or oil of cassia, has for a very long time, up to

within a few years, always reached the market in a more or less adulterated state, a regular practice of the Chinese exporters being to dissolve ordinary resin in it (claiming afterward that the “resin” was caused by the oxidation of the oil through age) and often also to add petroleum to it. These frauds have been well shown up by Schimmel & Co., of Leipsic; and in consequence thereof, the quality of oil of cassia exported from China has been greatly improved. Oil of cassia when pure has a specific gravity of 1·060 to 1·065, and should contain not less than seventy-five per cent of cinnamyl aldehyde.

Oil of cinnamon leaves is an inferior product, often used for adulterating oil of Ceylon cinnamon. It does not deserve notice by the perfumer.

As an appendix we may add in this connection a description of the

Oil of Turpentine (Oleum Terebinthinæ),

because it must be called an important substance to know for the perfumer, inasmuch as it is very frequently used for the adulteration of different essential oils. Oil of turpentine, which is obtained from incisions into the bark of different fir and pine trees, the exuding resin being distilled with water, comes into commerce from various sources. Different sorts are distinguished, but to the perfumer only the rectified oil of turpentine, oleum terebinthinæ rectificatum, is important. Oil of turpentine has a yellowish color and a decidedly disagreeable, resinous, and burnt taste. By repeated distillation, especially over quicklime or chloride of lime (bleaching powder), it is finally obtained as a colorless, very refractive liquid with a density of 0·855 to 0·870 and a boiling-point at 160° C. (320° F.). Its odor is peculiar, but not easily distinguished from that of old essential oils, such as oils of caraway, anise, etc. One peculiarity of oil of turpentine is that its odor is easily masked by that of other essential oils, so that, for instance, a comparatively large quantity of oil of turpentine needs the addition of but little oil of anise to impart to the entire mixture a rather pronounced odor of anise. This peculiarity has led to the frequent employment of rectified oil of turpentine for the adulteration of other essential oils.

CHAPTER IX.
THE ADULTERATIONS OF ESSENTIAL OILS AND THEIR RECOGNITION.

We find it necessary to devote a special chapter to the adulterations of the commercial essential oils because an experience of many years has shown us that hardly any other group of products is subject to so many sophistications as essential oils. The high price of most aromatic substances and the difficulty of recognizing the adulteration furnish an inviting field to the unscrupulous manufacturer. In the best interest of the perfumer, therefore, we advise the purchase of essential oils only from renowned reliable houses, even at higher prices, for the cheap commercial products are almost worthless, since they are almost without exception adulterated.

The adulterations are very manifold. Some expensive oils are mixed with cheaper ones having a similar odor—for instance, oil of rose with oil of geranium or oil of geranium grass; oil of orange flowers with the oil from Philadelphus coronarius; oil of verbena with oil of lemon grass; oils of caraway, anise, and fennel with oil of turpentine; oil of cinnamon with oil of cassia, etc. Besides these, other deceptions are practised—for instance, oil of anise is mixed with oil of turpentine and in order to make the mixture congeal readily (which is the characteristic of true oil of anise, as above stated) paraffin or spermaceti is added. A similar practice prevails with adulterated oil of rose and other viscid oils. Oil of bitter almond we have found adulterated with or entirely replaced by nitrobenzol, etc.

The demonstration of the adulteration of an essential oil by chemical means offers many difficulties. We devote particular attention to the physical characteristics, for experience has shown us that the olfactory organ—provided it is very expert—is often able to determine the genuineness of any aromatic substance when other tests have given only uncertain results, or can give certain results only in the hands of experts. To make this test, however, quite reliable, it is necessary to be familiar with the substances in their pure unadulterated condition.

The manufacturer of perfumery, therefore, should spare neither trouble nor pecuniary sacrifices to obtain possession of absolutely genuine specimens of those essential oils, even in minute quantities, which he intends to employ. Such

samples should be carefully preserved (protected from heat, evaporation, daylight, etc.) for the purpose of immediate comparison with the oils to be purchased.

As above stated, the physical properties of the essential oils usually furnish the means of recognizing their purity, and these give more reliable results to the practical perfumer than the chemical tests. The most valuable points are furnished by the boiling-point, the congealing-point, and the density of the oils. The following table gives the boiling and congealing points of the most important essential oils in degrees of the centigrade thermometer, together with the density (or specific gravity); where two figures are given, they indicate the extreme limits found in genuine samples.

Special characteristics of some essential oils with reference to their action at low temperatures or their melting-point are given in the column "Remarks."

Oil of turpentine, paraffin, wax, and spermaceti being frequently used for the adulteration of essential oils, have been included in the table.

If accurate results are aimed at in the examination of an essential oil according to this table, the specific gravity should be determined by means of a scale sensitive to one one-thousandth gram, and the thermometer should be graduated to the tenth of a degree.

Table Showing the Approximate Density, Boiling and Congealing Points of the most Important Essential Oils Used in Perfumery.

Essential Oil of	Density.	Boiling Point, Deg. C.	Congealing Point, Deg. C.	Remarks.
Absinth	0·895	...	...	
Anise	0·980	...	+10-15	
Bergamot	0·850-0·890	188	-24	
Bitter almond	1·040	180	...	
Do., art. (nitrobenzol)	1·866	213	+3	
Cajuput	0·880	...	...	
Calamus	0·962	...	...	
Camomile	0·924	160-210	...	

Camphor (Borneo)	...	212	...	Melts at 198
Camphor (Chinese)	0·985	205	...	Melts at 175
Caraway	0·960	195	...	
Cassia	1·060	252-255	...	
Cedar wood	...	264	-22	
Cinnamon	1·030-1·035	240	below -25	
Cinnamon leaf	1·053	...	...	
Clove	1·034-1·055	248	below 20	Forms crystals -16
Coriander	0·871	150-200	...	
Crispmint	0·978	...	...	
Cubeb	0·880	...	...	
Fennel	0·960-0·980	...	+8	
Gaultheria	1·173	224	...	
Geranium	0·895	216-220	...	Forms crystals -16
Hyssop	0·889	...	...	
Juniper	0·870	...	...	
Lavender	0·870-0·940	186-192	...	
Spike-lavender	...	140	...	
Lemon	0·850-0·870	177-250	...	
Lemon grass	0·870-0·898	220	-22	
Limetta	0·931	...	...	
Mace	0·890-0·950	...	...	
Marjoram	0·890-0·920	163	...	
Melissa	0·855	...	...	

Neroli	0·889-0·889	175	...	Forms crystals -16
Nutmeg	0·880-0·948	172	...	
Nutmeg butter	...	...	31	
Olibanum	...	162	...	
Orange, bitter	0·830-0·860	176	...	
Orange, sweet	0·840-0·850	176	...	
Parsley	1·015	...	...	
Patchouly	0·950-1·012	282-294	...	
Peppermint	0·902-0·930	188-212	...	
Portugal (orange peel)	0·840-0·850	176	...	
Rose	0·832	229	+14-20	
Rosemary	0·895-0·916	185	...	
Rue	0·911	...	...	
Sage	0·902	...	...	
Santal	0·950-0·980	288	-22	
Sassafras	1·082	...	...	
Serpyllum	0·890-0·920	...	...	
Star-anise	0·982	...	...	
Thyme	0·870-0·940	170-180	...	
Vanilla	...	150	76	
Vetiver	1·007	286	...	
Wintergreen	1·180	220	...	
Ylang-ylang	0·980	...	...	

Turpentine	0·855-0·870	160	...	
Paraffin	0·870	...	...	Melts at 50-65
Wax	0·960-0·970	...	...	Melts at 65-70
Spermaceti	0·943	...	...	Melts at 45-50

In buying essential oils, except it be from a house whose reputation is a guaranty of their genuineness, it is to the interest of the perfumer to make a test. He must look for certain substances which are generally used for the sophistication of essential oils. These are: A. Other essential oils; B. Fixed oils; C. Alcohol; D. Paraffin, spermaceti, wax.

A. Adulteration of Essential Oils with Other Essential Oils.

This mode of adulteration, which is frequent, is naturally the one most difficult of demonstration. In the case of cheap oils such as those of caraway, lemon, orange peel, etc., rectified oil of turpentine is almost without exception the adulterant. The methods usually recommended, such as attempting to dissolve out the oil of turpentine by strong alcohol, hoping thus to separate it from the essential oil, are without practical value.

The adulteration can, however, often be demonstrated by rubbing a drop of the suspected oil on a glass plate and testing the odor, provided the olfactory organ is trained. As the above table shows, the oils have different high boiling-points, while oil of turpentine boils at a rather low temperature, hence it evaporates sooner than the others and can be demonstrated by its odor.

The demonstration of an adulteration with an essential oil is most certain by so-called fractional distillation. Some of the oil to be examined (about four to six fluidrachms) is placed in a small retort with condenser and heated to a temperature a few degrees below the boiling-point of the oil in question. If, for instance, oil of bergamot adulterated with oil of turpentine is to be tested, it is heated carefully to nearly 188° C. (370° F.), the boiling-point of the oil of bergamot; the oil of turpentine which boils at 160° C. (320° F.) passes over completely, while the oil of bergamot remains in the retort.

Fractional distillation is also the most reliable way of demonstrating an

adulteration with a fixed oil or with paraffin, wax, or spermaceti. An adulteration of oil of lavender with oil of spike-lavender, which is otherwise barely recognizable, is positively shown by this method; even oil of geranium in oil of rose, oil of cassia in oil of cinnamon, etc., may be thus demonstrated.

B. Adulteration of Essential Oils with Fixed Oils.

An addition of fixed oils can be easily demonstrated by agitation of the oil with strong alcohol in which the essential oil dissolves, while the fixed oil remains unchanged. Castor oil, however, is likewise soluble in alcohol and for this reason is frequently used for the adulteration of essential oils. Yet the presence of a fixed oil can also be shown in a very simple manner by placing a drop of the suspected oil upon white paper and leaving it for some hours in a warm spot. If the oil was pure, the translucent stain on the paper will disappear completely (also when the oil was adulterated with turpentine); but if it was mixed with a fixed oil, the stain will remain permanently and cannot be removed from the paper even by strong heat.

C. Adulteration with Alcohol.

This frequent adulteration is demonstrated either by fractional distillation, when the alcohol passes over first between 70° and 80° C. (158° and 176° F.), or by the use of the vessel illustrated in Fig. 31, which is divided into 100 equal parts.

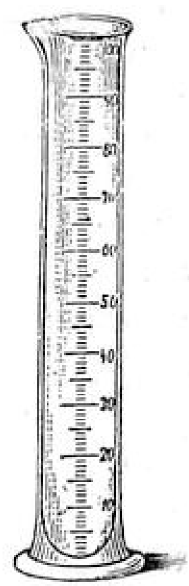

FIG. 31.

The vessel is filled to the tenth division with the oil to be tested, and water is added to bring the volume to the 50 mark. If alcohol is present, it is taken up by the water so that the volume of oil appears to diminish. If the oil reaches to the mark 7, it contained three volumes of alcohol, or in other words it was mixed with thirty per cent of alcohol. It is true, essential oils likewise dissolve somewhat in water, but in such minute quantities as not to affect the success of the test.

D. ADULTERATION WITH PARAFFIN, SPERMACETI, OR WAX.

This mode of adulteration is practised mainly with viscid oils which congeal at rather high temperatures, such as oils of anise, rose, etc., the essential oils being usually mixed at the same time with oil of turpentine or paraffin. The fraud is easily detected by fractional distillation.

Oil of bitter almonds is often adulterated with oil of mirbane; this can be demonstrated by shaking 1 volume of the oil with 17 volumes of alcohol of 45%, and setting the mixture aside to settle. The nitrobenzol (oil of mirbane) will then collect at the bottom. Oil of Rose may be tested as follows: Mix the oil with an equal quantity of concentrated sulphuric acid. Neither the color nor the odor of the oil should be changed, but if oil of geranium was present a disagreeable odor and a darker color is produced.

It has been proposed, too, to test the oils by heating with iodine or nitric acid

and determining the purity by the reaction; but the results with the different oils are so similar that the test is almost worthless. We have had the same experience with the test by nitro-prusside of copper which on being heated with essential oils gives colored precipitates differing with various oils, but still so similar that they cannot be relied upon. We have found in all cases that a comparison of an oil with a sample of known purity is the best, or else the tests given in the preceding pages.

CHAPTER X.
THE ESSENCES OR EXTRACTS EMPLOYED IN PERFUMERY.

The term *essence* or *extract* in perfumery means a solution of an aromatic substance in strong alcohol. These solutions are generally made as concentrated as possible and in this form find application in the manufacture of handkerchief perfumes and of certain odors bearing a special name. The so-called extrait d'œillet, extract of pink, or the favorite perfumes known as new-mown hay have nothing in common with either pink or hay except the name; like many other odors, both are merely mixtures of different essences or extracts.

Besides the manufacture of true perfumes, essences or extracts are also used for scenting fine soaps, sachets, mouth washes, etc. For the latter, too, use is often made of the so-called aromatic waters (eaux aromatisées) which are obtained as a by-product in the distillation of fragrant plants, and have a very fine odor owing to the small amount of the aromatic substance they hold in solution. To this class belong orange-flower water (Aqua Naphæ triplex, eau de fleurs d'oranges), peppermint water (Aqua Menthæ, eau de menthe), and many others.

Essences or extracts can be made in two ways: in the case of aromatic substances which are obtainable in the pure state—that is, essential oils—by dissolving them in strong alcohol in definite proportions; in the case of aromatics combined with a fatty substance by one of the processes described above, by treating the pomade (lard, or other perfectly bland, sweet, and in itself odorless fat combined with the aromatic) or huile antique (fixed oil holding the aromatic substance in solution) with the strongest alcohol.

According to the action of the alcohol upon the pomade or huile antique at ordinary or higher temperature, the process is called cold or warm infusion. Cold infusion furnishes the odor in a much more delicate and superior form than the warm. The cold infusion requires for complete solution of the aromatic four to six weeks; the warm, ten to fourteen days. Although the former consumes a much longer time, it is to be preferred, as the heat injures the odor. Pomades or huiles antiques are never completely exhausted by a single treatment with alcohol. Even when heat is employed they always retain a portion of the aromatic with great tenacity; a second and third infusion still abstracts odor from

them, and finally nothing remains but pure fat with a pleasant odor which is stained and sold commercially as pomade under the name of the respective odor —violet, orange flower, reseda, etc.—or else is used over again in the factory for the extraction of flowers.

Experience has shown us that it is best to infuse the pomades or huiles antiques twice in the cold and to use the two fluids united for the finest perfumes; the residue by warm infusion furnishes an essence of second quality, and superior pomades or fragrant oils. The infusion is generally effected in strong glass bottles of a capacity of three to five gallons; about five to six quarts of cologne spirit being poured over six to eight pounds or pints of fat or huile antique.

In treating huiles antiques all parts of the oil should be brought into contact with the alcohol as much as possible, hence the bottles must be frequently shaken; a better plan is to bring the tightly closed bottles into an apparatus in which they are constantly agitated by rotation. Such an apparatus is easily made by placing the bottles in an inclined position between two rods fastened to a common axis which is kept revolving. The adjoining illustration (Fig. 32) shows such a contrivance which is required also in the manufacture of perfumes. The rotation may be effected by clockwork, water power, or any other motor.

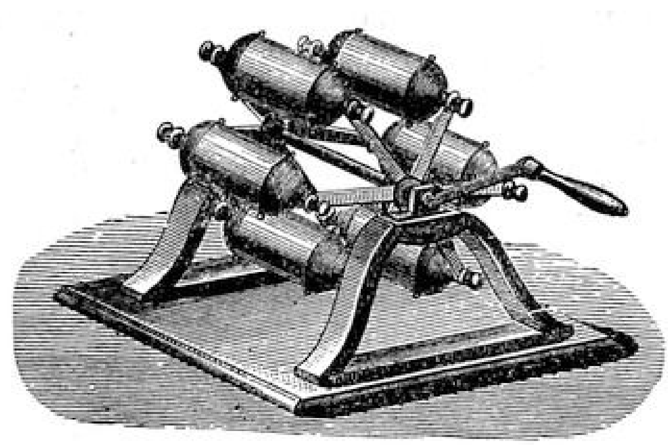

Fig. 32.

Pomades being solid must be divided into small pieces which may be done with a knife, but the following procedure is more suitable and less laborious. The pomade is placed in a tin cylinder four inches wide and about a foot high, which is open at one end, the other being closed with a tin plate having several fine openings. The cylinder filled with pomade is set upon the bottle containing the alcohol for extraction, and the pomade is pressed through the openings in the

shape of thin threads by means of a piston.

In this way, of course, the pomade acquires a very large surface and rapidly yields the aromatic substance to the alcohol. The odor of the pomade differs according to the length of time which it has been subjected to the flowers, and on being treated with alcohol furnishes extracts of corresponding strength. This should be borne in mind in the manufacture of perfumes which are intended to be uniform in quality.

After two cold and one warm infusion of the pomade, it may be made to yield some more aromatic material by heating it carefully to its exact melting-point, when extract again appears on the surface and can be poured off by gentle inclination of the vessel.

In the following pages we give the proportions by weight and measure employed by the most important French, English, and German manufacturers for their pomade extracts or solutions of the essential oils in alcohol. As to the latter we again repeat that it must be over 88 to 90% strength according to Tralles or even stronger, and that it must be absolutely free from any trace of amyl alcohol (potato fusel oil), the least amount of which impairs the delicacy of the odor. In this country (the United States) there is no difficulty whatever in obtaining alcohol of proper strength. The market offers scarcely any other but that of 94%. Of course deodorized alcohol, or so-called Cologne spirit should be used. Grain and wine spirits are the kinds which when rectified are to be preferred to all others. All the citron oils (*i.e.*, oils of lemon, bergamot, and those with similar odor), rose oils (oils of rose, geranium, and rhodium), and many other sweet scents are most fragrant when dissolved in pure spirit of wine, while the odors from the animal kingdom and those of violet (violet and orris root) smell sweetest when dissolved in grain spirit.

The essences prepared from pomades or huiles antiques usually contain in solution some fat which is best removed by cooling. To this end the vessels containing the essences are placed in a vat and surrounded with pellets of ice and crystals of chloride of calcium. By this mixture the temperature can be reduced below-20° C. (-4° F.), and after some time the fats are deposited in a solid form at the bottom of the vessel. This is then taken from the vat and the essence carefully poured from the sediment.

The alcoholic extracts of the pomades or solutions of the aromatics are called essences or extracts (French, extraits); the solutions obtained from resins and

balsams are usually termed tinctures.

While some extracts, owing to their strong odor, can be used only when diluted with alcohol, others are employed in perfumes as such. Pure extracts (extraits purs) are those containing only a single odor and are but rarely used as perfumes; the latter are usually mixtures of several, often a great many odors.

CHAPTER XI.
DIRECTIONS FOR MAKING THE MOST IMPORTANT ESSENCES AND EXTRACTS.

NOTE.—There is considerable confusion, in works on perfumery, regarding the terms *essence* and *extract*. In French works, *essence* always means "essential oil." Thus "essence de rose" is "essential oil of roses," or "attar (otto) of roses." *Extrait* (French) is used of alcoholic solutions of oils, as well as alcoholic extracts of pomades, or of substances not wholly soluble in alcohol, and also of compound liquids. In English, *essence* is used, and should be confined to alcoholic solutions of essential oils ("essence of lemon," "essence of peppermint"). It is, then, equivalent to the term "spirit," which is also used only of alcoholic solutions of essential oils or other volatile substance (such as: spirit of peppermint, essence of peppermint; spirit of camphor, etc.). Liquid alcoholic extracts of substances not wholly soluble in alcohol are properly called *tinctures* (for instance, tincture of benzoin, tincture of musk); and liquid alcoholic extracts of pomades, or compound odorous liquids, are best comprised under the general term *extracts*.

We shall employ the terms *essence*, *extract*, and *tincture* in the sense here explained.

EXTRACT OF CASSIE (EXTRAIT DE CASSIE).

Cassie pomade	6 lbs.
Alcohol	5 qts.

Extract of cassie has a fine green color—a fact which is not desirable in perfumes intended for the handkerchief because colored preparations leave stains. However, extract of cassie is rarely used pure, but is generally mixed with other odors for handkerchief perfumes, whereby the color is so much diluted that it may be disregarded. This extract—and the same remark applies to all the others—immediately after its preparation must be put into tightly closed vessels and preserved in the coolest attainable dark place; for light, air, and heat must be called the destroyers of perfumes, since the most delightful odors eventually disappear under their influence.

For the benefit of manufacturers who import this extract from Southern France, the main source of supply, we may add that the word cassie or extrait de cassie, derived from the flowers of Acacia farnesiana, might readily give rise to confusion with extrait de cassia, made from the bark of the cinnamon cassia.

Tincture of Ambergris (Extrait d'Ambregris).

Ambergris	5 oz.
Alcohol	5 qts.

The ambergris should be broken into small pieces with a chopping knife repeatedly moistened with alcohol, and allowed to digest in the alcohol for some weeks at a temperature of about 30° C. (86° F.).

Tincture of Benzoin (Extrait de Benjoin).

Benzoin	10 oz.
Alcohol	5 qts.

This tincture is not so much used for handkerchief perfumes as for preserving many pomades, as it possesses the valuable property of preventing fats from becoming rancid.

Essence of Bergamot (Extrait de Bergamotte).

Oil of bergamot	8 oz.
Alcohol	5 qts.

Tincture of Castor (Extrait de Castoreum).

Castor	2½ oz.
Alcohol	5 qts.

Tincture of Musk Seed (Extrait d'Ambrette).

Musk seed, powdered	1 lb.
Alcohol	5 qts.

Essence of Bitter Almond (Extrait d'Amande).

Oil of bitter almond	1¾ oz.
Alcohol	5 qts.

Essence of Calamus (Extrait de Glaïeul).

Oil of calamus	1¾ oz.
Alcohol	5 qts.

This essence has a pleasant odor, but it is not valued as a true perfume; though if it is mixed with other essences or extracts until its characteristic odor is no longer recognizable it furnishes a very useful basis for many cheap articles.

Essence of Cedar (Extrait de Cèdre).

Oil of cedar wood	½ lb.
Alcohol	5 qts.

This essence made from the oil is colorless and can be used immediately for handkerchief perfumes.

Tincture of Cedar (Extrait de Bois de Cèdre).

This is made by digesting finely rasped cedar wood with strong alcohol, namely:

Cedar wood chips	6 lb.
Alcohol	5 qts.

The result is a fragrant tincture with a beautiful deep red color which cannot be employed for handkerchief perfumes, but for many cosmetic preparations such as mouth washes and for scenting soap.

Essence of Citronella.

Extrait de citronella	3 to 3½ oz.
Alcohol	5 qts.

Essence of Lemon Grass (Extrait de Schoenanthe).

Oil of lemon grass	2 to 3 oz.
Alcohol	5 qts.

EXTRACT OF LILAC (EXTRAIT DE LILAS).

The genuine is seldom made; the preparation sold under this name consists of:

Oil of bitter almond	15 grains.
Extract of orange flowers, from pomade	2 qts.
Extract of tuberose, from pomade	3 qts.
Tincture of civet	¼ pint.

Of late, extract of lilac is often prepared by means of lilacin or terpineol, as follows:

Lilacin	1 oz.
Alcohol	1 pint.

EXTRACT OF HONEYSUCKLE (EXTRAIT DE CHÈVRE-FEUILLE).

The author has made this extract by treating the pomade prepared from the flowers of Lonicera Caprifolium, in the following proportion:

Honeysuckle pomade	6 lb.
Alcohol	5 qts.

The commercial extract of this name is always a compound which may be prepared according to the following formula:

Extract of rose, made from the pomade	1 qt.
Extract of tuberose, from pomade	1 qt.
Extract of violet, from pomade	1 qt.
Tincture of vanilla	½ pint.
Tincture of Tolu	½ pint.
Oil of bitter almond	15 grains.
Oil of neroli	8 grains.

ESSENCE OF GERANIUM.

Oil of geranium (rose-geranium)	5½ oz.
Alcohol	5 qts.

In the commercial article the essence of lemon grass is often substituted for the essence of geranium, the odor being similar, though less delicate.

Extract of Cucumber (Extrait de Concombres).

Cucumbers	8 lbs.
Alcohol	5 qts.

The cucumbers are peeled, cut into thin slices, and macerated in the warm alcohol. If the odor is not strong enough in the alcohol after some days, it is poured over some more fresh slices, the macerated residue is expressed, and at the end of the operation all the liquids are united and filtered.

Extract of Heliotrope (Extrait de Héliotrope).

Heliotrope pomade	6 lb.
Alcohol	5 qts.

This has thus far been manufactured only by French perfumers at very high prices; the great majority of the so-called extracts of heliotrope are compounded from:

Extract of rose, from pomade	2 qts.
Extract of orange flowers, from pomade	14 oz.
Tincture of ambergris	7 oz.
Tincture of vanilla	4 qts.
Oil of bitter almond	75 grains.

This is used as a perfume as such.

More recently, piperonal, under the name heliotropin, is used for making this extract—

Heliotropin	¼ oz.
Alcohol	1 Pint.

It is necessary to blend this with various other aromatics in order to cover the pronounced odor. A little cumarin is usually of great help. But is it impossible, as yet, to give reliable proportions which would suit all cases.

Extract of Jasmine (Extrait de Jasmin).

Jasmine pomade	6 lb.
Alcohol	5 qts.

Essence of Lavender (Extrait de Lavande).

Oil of lavender	7 oz.
Alcohol	5 qts.

A far superior essence may be prepared by the distillation of:

Oil of lavender	7 oz.
Rose water	2 qts.
Alcohol	10 qts.

The distillation is continued until one-half of the entire liquid has passed over; the residue in the still furnishes an essence of lavender of the second quality.

Extract of Wallflower (Extrait de Giroflé).

The genuine odor can be made only from the pomade; the commercial extract consists of:

Extract of cassie, from pomade	1 pint.
Extract of orange flower, from pomade	1 qt.
Extract of rose, from pomade	1 qt.
Tincture of vanilla.	1 pint.
Tincture of orris root	1 pint.
Oil of bitter almond	1 pint.

Extract of Lily (Extrait de Lys).

As to this delightful odor the remark made under the preceding head applies

likewise; artificial extract of lily consists of:

Extract of cassie, from pomade	3 pints.
Extract of jasmine, from pomade	13½ fl. oz.
Extract of orange flower, from pomade	27 fl. oz.
Extract of rose, from pomade	3 pints.
Extract of tuberose, from pomade	3 qts.
Tincture of vanilla	40½ fl. oz.
Oil of bitter almond	30 grains.

Essence of Lemon (Extrait de Limon).

Oil of lemon	7 oz.
Alcohol	5 qts.

Extract of Magnolia (Extrait de Magnolia).

This favorite perfume is a mixture of:

Extract of orange flower, from pomade	2 qts.
Extract of rose, from pomade	4 qts.
Extract of tuberose, from pomade	1 qt.
Extract of violet, from pomade	1 qt.
Oil of bitter almond	40 grains.
Oil of lemon	16 grains.

Essence of Peppermint (Extrait de Menthe).

Oil of peppermint	6½ oz.
Alcohol	5 qts.

Tincture of Musk (Extrait de Musc).

Musk	2½ oz.
Alcohol	5 qts.

This tincture is of special importance, not so much because of its odor as on

account of its useful property of fixing other very volatile odors.

Extract of Myrtle (Extrait de Myrte).

Owing to the small yield of essential oil furnished on distillation by the myrtle and the comparatively high price of the oil of myrtle, nearly all the extract of myrtle is prepared artificially, as follows:

Extract of jasmine, from pomade	½ pint.
Extract of orange flower, from pomade	1 qt.
Extract of rose, from pomade	2 qts.
Extract of tuberose, from pomade	1 qt.
Tincture of vanilla	1 qt.

Extract of Narcissus.

In perfumery, two extracts of narcissus are distinguished—true extract of narcissus, from the flowers of the garden plant, Narcissus poeticus, and the so-called extract of jonquille, from Narcissus Jonquilla, which is cultivated in Southern France and whose odor is obtained by maceration. Genuine extract of narcissus is even more rarely obtainable than extract of jonquille; the odors of both are imitated, mainly according to the following prescriptions:

1. Extract of Narcissus (Extrait de Narcisse).

Extract of jonquille, from pomade	2 qts.
Extract of tuberose, from pomade	3 qts.
Tincture of storax	½ pint.
Tincture of tolu	½ pint.

2. Extract of Jonquille (Extrait de Jonquille).

Extract of jasmine, from pomade	2 qts.
Extract of orange flower, from pomade	1 qt.
Extract of tuberose, from pomade	2 qts.
Tincture of vanilla	½ pint.

Essence of Clove (Extrait de Clous de Girofles).

Oil of clove	4½ oz.
Alcohol	5 qts.

Extract of Pink (Extrait d’Œillet).

This pleasant odor occurs in commerce only as an imitation.

Extract of cassie, from pomade	2½ pints.
Extract of orange flower, from pomade	2½ pints.
Extract of rose, from pomade	5 pints.
Tincture of vanilla	20 fl. oz.
Oil of clove, a sufficient quantity, about	75 grains.

The oil of clove which determines the characteristic odor of this extract is dissolved in a little alcohol; of this solution enough is gradually added to the mixture until the odor has become sufficiently strong.

Extract of Orange Flower or Neroli (Extrait de Fleurs d’Oranges, Extrait de Néroli).

Orange-flower pomade	6 lb.
Alcohol	5 qts.
Or,	
Oil neroli pétale	2½ oz.
Alcohol	5 qts.

The latter preparation is also called “essence of neroli.”

The extract prepared from the pomade furnishes this highly esteemed odor of a delicacy never to be approached by that made with oil. The alcoholic extract of the pomade perfumed with the flowers of Syringa (Philadelphus coronarius) also occurs in commerce as extract of orange flowers or neroli.

Essence of Patchouly (Extrait de Patchouli).

Oil of patchouly	1¼ oz.
Alcohol	5 qts.

This pure essence of patchouly has not a very pleasant odor; that made according to the following formula is far superior.

Oil of patchouly	1½ oz.
Oil of rose	⅜ oz.
Alcohol	5 qts.

Tincture of Balsam of Peru (Extrait de Pérou).

Peru balsam	10½ oz.
Alcohol	5 qts.

This tincture, though of a very pleasant odor, can be used only for scenting soap or sachets, as it has a very dark brown color; by distilling alcohol over Peru balsam a colorless extract is obtained, though of a fainter odor.

Essence of Allspice (Extrait de Piment).

Oil of allspice	3½ oz.
Alcohol	5 qts.

Extract of Sweet Pea (Extrait de Pois de senteur).

This extract, made almost exclusively in Southern France by maceration of the pomade, is but rarely met with in commerce; what passes under this name is made as follows:

Extract of orange flower, from pomade	2½ pints.
Extract of rose, from pomade	2½ pints.
Extract of tuberose, from pomade	2½ pints.
Tincture of vanilla	5¾ oz.

Extract of Reseda (Extrait de Mignonette).

Reseda pomade	5 to 6 lb.
Alcohol	5 qts.
Tincture of tolu	5½ oz.

The addition of the tincture of tolu is necessary here, owing to the extraordinary volatility of the delightful odor of mignonette, which is lessened by the addition of tincture of tolu.

Essence or Extract of Rose (Extraits de Rose).

In commerce several sorts of essence or extract of rose are distinguished; only the cheaper grades are made by direct solution of the oil of rose in alcohol, the better grades are prepared only from pomades. As the rose is the noblest of flowers, so are these odors the most magnificent thus far produced by the art of perfumery, since they are approached in delicacy and fragrance only by the genuine extracts of orange flower and violet. The so-called rose waters (eaux de rose) are best obtained by distillation of fresh or salted rose leaves with water. The preceding formulæ will show that both extract of rose and rose water form important constituents of many compound essences, hence these materials require special attention. In the following pages we enumerate only those formulæ which are acknowledged as the best and furnish the finest product. As rose water likewise belongs among the rose odors we give directions for its preparation, and observe in passing that the precautions required in the manufacture of this one apply also to all aromatic waters (eaux aromatisées). The first essential to the production of a fine aromatic water is the employment of the freshest possible flowers; when kept in stock, chemical changes occur in the leaves which affect also the aromatic constituents and lead to a deterioration of the fragrance. Hence we urgently recommend to distil the freshly gathered flowers as soon as possible, even if the quantity on hand be small. Should this not be feasible, it is advisable to press the flowers immediately after gathering in stone-ware pots and to pour over them a saturated solution of table salt. A concentrated saline solution prevents decomposition by the abstraction of water; and thus larger quantities of flowers may be gathered and distilled with the salt solution. The majority of aromatic waters are prepared in this way, for instance, rose, jasmine, lilac, and others. They enter less into handkerchief perfumes than into various mouth and other washes, and cosmetics in general.

Rose Water (Eau de Rose Triple).

Rose leaves	4 lb.
Water	20 pints.

Mix them, and by means of steam, distil 10 pints.

The rose leaves are, of course, preferably to be used while fresh. If they are to be preserved for future use, they should be packed in stone-ware jars, and covered with a solution of common salt. This is poured off before distillation, but used over again for the same purpose.

Extract of Rose (Extrait de Roses Triple).

Rose pomade	8 lb.
Alcohol	5 qts.

Essence of [Oil of] Rose (Esprit de Roses Triple).

Oil of rose	3½ oz.
Alcohol	5 qts.

This essence is not so good as the extract.

Extract of China Roses (Essence de Roses jaunes).

Essence of rose (triple)	2 qts.
Tincture of tonka	½ pint.
Extract of tuberose	2 qts.
Extract of verbena	½ pint.

Extract of Sweet-Brier (Wild Rose) (Extrait d'Eglantine).

Extract of cassie, from pomade	44 fl. oz.
Extract of orange flower, from pomade	44 fl. oz.
Extract of rose, from pomade	2½ qts.
Essence of rose (triple)	44 fl. oz.
Oil of lemon grass	¼ oz.
Oil of neroli	¼ oz.

Extract of Moss-Rose (Extrait de Roses Mousseuses).

Extract of rose, from pomade	2 qts.
Extract of orange flower, from pomade	1 qt.
Essence of rose (triple)	1 qt.

Tincture of ambergris	1 pint.
Tincture of musk	½ lb.

Extract of Tea-Rose (Extrait de Rosa théa).

Extract of rose, from pomade	1 qt.
Extract of geranium, from pomade	1 qt.
Extract of orange flower, from pomade	½ pint.
Essence of rose (triple)	1 qt.
Tincture of santal	½ pint.
Tincture of orris root	½ pint.

Extract of White Rose (Essence de Roses blanches).

Extract of rose, from pomade	1 qt.
Extract of jasmine, from pomade	1 pint.
Extract of violet, from pomade	1 qt.
Essence of patchouly	½ pint.
Essence of rose (triple)	1 qt.

Extract of Twin-Roses (Essence de Roses jumelles).

Extract of rose, from pomade	5 qts.
Oil of rose	1¾ oz.

Extract of Santal (Extrait de Santal).

Tincture of santal	3½ oz.
Essence of rose (triple)	1 pint.
Alcohol	9 pints.

Tincture of Storax (Essence de Styrax).

Storax	10½ oz.
Alcohol	5 qts.

Though this tincture has a pleasant odor, it is not ordinarily used by itself, but for fixing other odors.

Tincture of Tolu (Extrait de Baume de Tolou).

Tolu balsam	10½ oz.
Alcohol	5 qts.

The remark made under tincture of storax applies also to this.

Tincture of Tonka (Extrait de Tonka).

Tonka beans, crushed	21 oz.
Alcohol	5 qts.

Extract of Tuberose (Extrait de Tuberose).

Tuberose pomade	8-10 lb.
Alcohol	5 qts.
Tincture of storax	10 fl. oz.

Tincture of Vanilla (Extrait de Vanille).

Vanilla, sliced	½ lb.
Alcohol	5 qts.

Extract of Violet (Extrait de Violette).

Violet pomade	6-7 lb.
Extract of cassie	6½ fl. oz.
Alcohol	5 qts.

This extract is very expensive; a good imitation is made as follows:

Extract of cassie, from pomade	2 qts.
Extract of rose, from pomade	1 qt.
Extract of tuberose, from pomade	1 qt.
Tincture of orris root	1 qt.
Oil of bitter almond	15 grains.

Tincture of Orris Root (Extrait d'Iris).

Orris root, powdered	6-7 lb.
Alcohol	5 qts.

This tincture is sold as a very cheap violet perfume, but it has also considerable value to perfumery in general, owing to its fixing power.

Extract of Verbena (Extrait de Verveine).

True oil of verbena is rather expensive. Hence artificial compositions are employed under the name of verbena which resemble the true odor, though not exactly like it.

Extract of Verbena A.

Oil of lemon grass	75 grains.
Oil of lemon	14 oz.
Oil of orange peel	3½ oz.
Alcohol	5 qts.

This extract is cheap and is used immediately as a perfume. The extract usually sold under the French name Extrait de verveine is more expensive and far superior:

Extract of Verbena B.

Extract of orange flower, from pomade	30 fl. oz.
Extract of rose, from pomade	1 qt.
Extract of tuberose, from pomade	⅓ oz.
Oil of citron zeste	½ oz.
Oil of lemon grass	¾ oz.
Oil of lemon peel	9 oz.
Oil of orange peel	4½ oz.
Alcohol	4⅔ pints.

As already explained, if hand-pressed oil of lemon (made by the écuelle process) is available, then the “oil of citron zeste” (which is *this* particular kind of oil) and the “oil of lemon” may be simply added together; that is, 9½ oz. of oil of lemon are used.

Extract of Volcameria (Extrait de Volcameria).

This extract is no more derived from the fragrant blossom whose name it bears than are those of the lily, pink, and others met with in commerce. It is prepared according to the following formula:

Extract of jasmine, from pomade	1 pint.
Extract of rose, from pomade	1 qt.
Extract of tuberose, from pomade	2 qts.
Extract of violet, from pomade	2 qts.
Tincture of musk.	½ pint.

Essence of Vetiver (Extrait de Vétiver).

Oil of vetiver	2½ oz.
Alcohol	5 qts.

Tincture of Olibanum (Extrait d'Oliban, Extrait d'Encens).

Olibanum	1 lb.
Alcohol	5 qts.

Extract of Wintergreen (Extrait de Gaulthérie).

This essence is more commonly sold under the English than the French name. Its composition is the following:

Tincture of ambergris	1 pint.
Extract of cassie	1 qt.
Essence of lavender	1 pint.
Extract of orange flower, from pomade	1 qt.
Extract of rose, from pomade	2 qts.
Tincture of vanilla.	1 pint.
Essence of vetiver	1 pint.

Tincture of Civet (Extrait de Civette).

Civet.	1—1½ oz.
Orris root	1—1½ oz.
Alcohol	5 qts.

Tincture of civet is exceedingly lasting and is generally employed for fixing other odors. As to the quantity required to fix perfumes in general, we may state that it varies with the nature of the odor. As a rule, about one-sixteenth part of tincture of civet suffices for even the most volatile perfumes.

Tincture of Cinnamon (Extrait de Canelle).

Cinnamon	1 lb.
Alcohol	5 qts.

Owing to the yellow color left upon handkerchiefs by perfumes prepared with this extract, it can be used only for common goods, but it is more frequently employed for scenting soaps.

CHAPTER XII.
THE DIVISION OF PERFUMERY.

According to the purposes for which they are intended, the various articles of perfumery may be divided into several groups. They are:

True Perfumes.

A. *Liquid.*—Alcoholic handkerchief perfumes. Among these are the so-called extracts, bouquets, and waters. Ammoniacal and acid perfumes: aromatic vinegars and volatile ammoniacal salts.

B. *Dry.*—Sachet powders, fumigating pastils and powders.

Preparations for the Care of the Skin.

Emulsions, crêmes, perfumed soaps, toilet waters, nail powders.

Preparations for the Care of the Hair.

Hair oils, pomades, hair washes.

Preparations for the Care of the Mouth.

Tooth powders, mouth washes.

Cosmetics.

Paints, powders, hair dyes, depilatories, etc.

In connection with the description of these different articles some remarks will be made about the colors employed in perfumery and about the utensils used with the cosmetics, such as combs, brushes, sponges, etc.

CHAPTER XIII.
THE MANUFACTURE OF HANDKERCHIEF PERFUMES, BOUQUETS, OR AROMATIC WATERS.

The manufacture of handkerchief perfumes is very simple: the extracts prepared as directed in Chapter XI. are mixed in definite proportions and the perfume is finished. If the extracts are well seasoned, the perfumes blend in perfect harmony within a few days, and this time may be even shortened by the use of the apparatus illustrated in Fig. 32. If the extracts have been but recently prepared, a longer time will be required before the odor of the alcohol and the several constituents is imperceptible and all odors have blended into a harmonious whole.

If the manufacturer can afford to allow the finished extracts and perfumes to season for some length of time—of course, in well-closed and completely filled vessels—in a cool place, they will improve markedly in quality. Perfumes which contain but a single odor or in which a certain odor distinctly predominates are usually called by the name of the respective plant, etc., under a French title, *e.g.*, extrait de violette, extrait de reséda, etc. Combinations of many odors which produce an agreeable impression as a whole, while no one odor predominates, are called bouquets or waters; for instance, Bouquet de Jockey Club, Eau de Mille Fleurs, Cologne Water, Hungarian Water, etc.

The mixture of the extracts is effected in strong glass bottles of a capacity exactly adapted to the perfume, so as to be completely filled. For perfumes which require seasoning to make the odors blend we use small glass balls of which enough are introduced into the bottle to make the mixture rise into the neck of the container which is then closed air-tight and preserved in a dark, cool place.

Of course, all perfumes should be perfectly clear and free from turbidity. The extracts made from pomades or essential oils are clear and furnish perfumes that remain so; extracts prepared from balsams or resins should be allowed to stand at rest for several weeks and then be carefully decanted from the sediment. Filtration should be dispensed with unless absolutely unavoidable, on account of the large amount of oxygen with which the extract would thereby come in contact, to the detriment of the odor.

The bottles in which the perfumes are mixed, as well as those in which they are put up for sale, must be perfectly dry, as a very small amount of water often suffices to separate a portion of the aromatics and to render the liquid turbid or opalescent.

Fine perfumes are always sold in glass vessels with ground-glass stoppers; cork has a peculiar odor which it would communicate to the liquid. For the more perfect exclusion of the air the stoppers and bottle necks are moreover covered with animal membrane, sheet rubber, or vegetable parchment, with an outer cap of white glove leather.

In the case of very expensive perfumes, much care is bestowed on the container; certain perfumes are filled into bottles of peculiar form and color, or into small porcelain jars provided with corresponding labels printed in gold and colors. Sometimes the container costs many times the price of the perfume. But as the finest perfumes are articles of luxury in the truest sense of the word, they require extreme care in their putting up; and good taste in the selection of the containers for fluids, pomades, cosmetics, powders, etc., is of as much importance to the perfumer as the possession of a sensitive and trained olfactory organ.

In the following formulas for the preparation of bouquets, the words extract, essence, and tincture have the same meaning as was explained under Chapter XI. For cheap perfumes the corresponding essential oils dissolved in alcohol, that is, the corresponding “essence,” is employed in place of the true “extract.”

CHAPTER XIV.
FORMULAS FOR HANDKERCHIEF PERFUMES.

Bouquet de l'Alhambra.

Extract of cassie	1 pint.
Extract of orange flower	1 pint.
Essence of geranium	1 qt.
Extract of tuberose	2 qts.
Tincture of civet	1 pint.

Extrait d'Ambre, I.

Tincture of ambergris	3 qts.
Tincture of musk	1½ pints.
Oil of rose	1 oz.
Tincture of vanilla	13½ fl. oz.
Alcohol	3 pints.

Extrait d'Ambre, II.

Essence of rose (triple)	2 qts.
Tincture of ambergris	4 qts
Tincture of musk	1 qt.
Tincture of vanilla	1 pint.

Bouquet de l'Amour.

Extract of cassie	1 qt.
Tincture of ambergris	1 pint.
Extract of jasmine	1 qt.
Tincture of musk	1 pint.
Extract of rose	1 qt.
Extract of violet	1 qt.

Baisers du Printemps (Spring Kisses).

Extract of cassie	1 pint.
Tincture of ambergris	3 fl. oz.
Extract of jasmine	6 fl. oz.
Extract of rose	5 pints.
Extract of violet	5 pints.
Essence of rose (triple)	10 fl. oz.
Oil of bergamot	120 grains.
Oil of lemon	30 grains.

Note. Here and in all succeeding formulas, "oil of lemon" is meant to be the finest "hand-pressed" oil.

Eau de Berlin.

Oil of anise	150 grains.
Oil of bergamot	1 oz.
Oil of cardamom	15 grains.
Oil of lemon	30 grains.
Oil of coriander	15 grains.
Oil of geranium	30 grains.
Oil of melissa	15 grains.
Oil of neroli	75 grains.
Oil of rose	30 grains.
Oil of santal	30 grains.
Oil of thyme	15 grains.
Alcohol	10 qts.

Buckingham Flowers.

Extract of cassie	1 qt.
Tincture of ambergris	1 pint.
Extract of jasmine	1 qt.
Extract of orange flower	1 qt.

Extract of rose	1 qt.
Tincture of orris root	1 pint.
Oil of lavender	40 grains.
Oil of neroli	40 grains.
Oil of rose	75 grains.

Bouquet d'Andorre.

Extract of jasmine	1 pint.
Extract of rose	1 pint.
Extract of tuberose	1 pint.
Extract of violet	1 pint.
Tincture of orris root	1 pint.
Oil of geranium	75 grains.

Bouquet du Bosphore.

Extract of cassie	1 qt.
Extract of jasmine	½ pint.
Extract of tuberose	½ pint.
Tincture of civet	18 grains.
Essence of rose (triple)	½ pint.
Oil of bitter almond	30 grains.

Bouquet des Chasseurs.

Extract of cassie	20 fl. oz.
Tincture of musk	20 fl. oz.
Extract of neroli	20 fl. oz.
Extract of orange flower	20 fl. oz.
Tincture of tonka bean	40 fl. oz.
Tincture of orris root	20 fl. oz.
Oil of lemon	½ oz.
Essence of rose (triple)	5 pints.

Bouquet de la Cour.

Tincture of ambergris	2 oz.
Extract of jasmine	1 qt.
Tincture of musk	2 oz.
Extract of rose	1 qt.
Extract of violet	1 qt.
Essence of rose (triple)	1 qt.
Oil of bergamot	45 grains.
Oil of lemon.	45 grains.
Oil of neroli	45 grains.

Bouquet de Chypre.

Tincture of ambergris	1 qt.
Tincture of musk	1 qt.
Tincture of tonka	1 qt.
Tincture of vanilla	1 qt.
Tincture of orris root	1 qt.
Essence of rose (triple)	2 qts.

Bouquet des Délices.

Tincture of ambergris	1 pint.
Extract of rose	1 qt.
Extract of tuberose	1 qt.
Extract of violet	1 qt.
Tincture of orris root	1 pint.
Oil of bergamot	½ oz.
Oil of lemon	1 oz.

Bouquet de Fleurs (Nosegay).

Tincture of benzoin	5½ oz.
Extract of rose	3 pints.

Extract of tuberose	3 pints.
Extract of violet	3 pints.
Oil of bergamot	2½ oz.
Oil of lemon	1¾ oz.
Oil of orange peel	1¾ oz.

Convallaria (Lily of the Valley, Fleurs de Mai).

Extract of cassie	1½ pints.
Extract of jasmine	1½ pints.
Extract of orange flower	1½ pints.
Extract of rose	1½ pints.
Tincture of vanilla	3 pints.
Oil of bitter almond	⅜ oz.

While this perfume is very pleasant, its odor has no resemblance to the delicate fragrance of Convallaria majalis, our ordinary lily of the valley.

Couronne de Fleurs (Garland of Flowers).

Extract of cassie	20 fl. oz.
Tincture of ambergris	13½ fl. oz.
Extract of jasmine	20 fl. oz.
Tincture of musk	13½ fl. oz.
Tincture of orris root	5 pints.
Oil of bergamot	1½ oz.
Oil of lavender	1½ oz.
Oil of clove	75 grains.
Oil of neroli	1½ oz.
Oil of rose	1½ oz.
Alcohol	5 pints.

Court Bouquet.

Oil of bergamot	⅜ oz.
Oil of neroli	24 grains.

Alcohol	5½ oz.
Orris root	1 oz.
Storax, liquid	8 grains.
Musk	3 grains.

Macerate for two weeks, and filter.

Esterhazy Bouquets.

An old renowned perfume, a former rival of Cologne water; the name is derived from a noble Hungarian family.

A. Bouquet d'Esterhazy (French formula).

Tincture of ambergris	½ pint.
Extract of neroli	1 qt.
Extract of orange flower	1 qt.
Tincture of tonka	1 qt.
Tincture of vanilla	1 qt.
Tincture of vetiver	1 qt.
Tincture of orris root	1 qt.
Essence of rose (triple)	1 qt.
Oil of clove	75 grains.
Oil of santal	75 grains.

B. Bouquet Esterhazy (German formula).

Calamus root	3 oz.
Cloves	3 oz.
Nutmeg	3 oz.
Alcohol	4 qts.

Macerate for two weeks and filter; in the filtrate dissolve:

Tincture of ambergris	6 oz.
Ammonia	30 grains.
Oil of bitter almond	30 grains.

Oil of lemon	3 oz.
Tincture of musk	6 oz.
Oil of neroli	60 grains.
Oil of orange peel	30 grains.
Oil of rose	75 grains.

Cèdre du Libanon (Cedar).

Oil of cedar wood	10½ oz.
Extract of rose	1 pint.
Alcohol	5 qts.

Fiori d'Italia.

Extract of cassie	1 pint.
Tincture of ambergris	5 oz.
Extract of jasmine	1 qt.
Tincture of musk	5 oz.
Extract of rose	2 qts.
Extract of violet	1 qt.
Essence of rose (triple)	1 qt.

Lilac (Extrait de Lilas).

Oil of bitter almond	15 grains.
Extract of orange flower	2 qts.
Extract of tuberose	3 qts.
Tincture of civet	2 to 3½ oz.

The above-named ingredients are exceedingly volatile; according to the desired permanence of the perfume, more or less of the extract of civet is added.

Essence des Bouquets, A (Ess. Bouquet).

Tincture of ambergris	1 pint.
Tincture of orris root	2 qts.

Essence of rose (triple)	2 qts.
Oil of bergamot	4½ oz.
Oil of lemon	1 oz.

Ess. Bouquet, B.

Extract of cassie	1 oz.
Extract of jasmine	1 oz.
Tincture of musk	1½ oz.
Oil of cassia	1½ oz.
Oil of lemon	½ oz.
Oil of lavender	1 oz.
Oil of neroli	½ oz.
Oil of clove	1½ oz.
Oil of palmarosa	1 oz.
Oil of petit grain	1 oz.
Oil of Portugal	1 oz.
Oil of rose	75 grains.
Oil of thyme	75 grains.
Alcohol	10 qts.

This perfume is much admired in England. The title Ess. Bouquet is an abbreviation of the full name given above.

Ess. Bouquet, C.

Tincture of ambergris	2 oz.
Tincture of orris	8 oz.
Essence of rose (triple)	1 pint.
Oil of lemon	¼ oz.
Oil of bergamot	1 oz.

Florida.

Oil of bergamot	60 grains.
Oil of lemon	90 grains.

Oil of lavender	15 grains.
Oil of clove	8 grains.
Alcohol	5 qts.

Bouquet de Flore.

Extract of rose	1 qt.
Extract of orange flower	1 pint.
Extract of tuberose	1 pint.
Extract of violet	½ pint.
Tincture of benzoin	3 fl. oz.
Tincture of storax	3 fl. oz.
Tincture of musk	1½ fl. oz.
Oil of citronella	¾ oz.
Alcohol	2 qts.

Honeysuckle (Extrait de Chèvre-feuille).

Extract of rose	1 qt.
Extract of tuberose	1 qt.
Extract of violet	1 qt.
Tincture of tolu	½ pint.
Tincture of vanilla	½ pint.
Oil of bitter almond	15 grains.
Oil of neroli	8 grains.

Heliotrope, A (Extrait de Héliotrope).

Extract of rose	2 qts.
Extract of orange flower	14 oz.
Tincture of ambergris	7 oz.
Tincture of vanilla	4 qts.
Oil of bitter almond	75 grains.

A very lasting perfume which is especially suitable for scenting the linen in a press.

Heliotrope, B.

Vanilla	15 grains.
Oil of neroli	2 drops.
Oil of bitter almond	1 drop.
Musk	1½ grains.
Benzoin	45 grains.
Cologne spirit	3½ oz.

Macerate for one week, and filter.

New-Mown Hay.

Hay owes its fragrance partly to cumarin, which is present in many plants, but in especially large amount in tonka beans. Hence all similar perfumes must contain tincture of tonka. Other aromatic substances, however, contribute to the odor of hay, but the cumarin gives, as it were, the keynote to its real odor.

A very pleasant perfume is made after the following formula:

Essence of rose (triple)	1 qt.
Essence of geranium	1 qt.
Extract of jasmine	1 qt.
Extract of orange flower	1 qt.
Extract of rose	1 qt.
Tincture of tonka	2 qts.

Some add to this perfume 1 pint of extract of cassie which imparts a greenish color to it.

Royal Horse-Guard's Bouquet.

Extract of orange flower	20 fl. oz.
Tincture of musk	10 fl. oz.
Extract of rose	5 pints.
Tincture of vanilla	20 fl. oz.
Tincture of orris root	20 fl. oz.

Oil of clove	120 grains.

Bouquet d'Irlande.

Extract of white rose	5 qts.
Tincture of vanilla	1 lb.

An exceedingly fine perfume.

Hovenia.

This plant, Hovenia dulcis, indigenous to Japan, has a peculiar odor, which, however, is not pleasant to European taste. The perfume sold under this name has a special odor, though it differs from that of the plant. It is made according to the following formula:

Oil of lemon	3 oz.
Oil of clove	¼ oz.
Oil of neroli	75 grains.
Oil of rose	75 grains.
Alcohol	5 qts.

Huntsman's Nosegay.

Essence of rose (triple)	1 pint.
Extract of cassie	6 fl. oz.
Extract of orange flower	6 fl. oz.
Tincture of musk	150 grains.
Tincture of tonka	1 pint.
Oil of citronella	150 grains.
Alcohol	3 qts.

Bouquet du Japon.

Extract of rose	1 qt.
Extract of orange flower	1 qt.
Essence of patchouly	½ pint.
Extract of verbena	1 pint.
Essence of vetiver	1 pint.
Tincture of civet	3 fl. oz.
Tincture of musk.	⅓ fl. oz.

Eau Japonaise.

Tincture of cedar wood	1 qt.
Essence of patchouly	1 qt.
Extract of santal	1 qt.
Extract of verbena	1 qt.
Essence of vetiver	1 pint.
Essence of rose (triple)	1 qt.

Jockey Club.

England first introduced a perfume under this name, which soon became popular and was largely imitated. Jockey Club perfume is among the finest known to the trade; the delicacy of its odor rests largely on the extracts of cassie and tuberose which are employed in their strongest form—an alcoholic extract of a pomade well charged with the odors of the plants. As in the case of Cologne water, there are a number of widely diverging formulas for its preparation, from which we select a few which furnish excellent perfumes.

Jockey Club, A (English formula).

Extract of cassie	1 pint.
Tincture of ambergris	¾ pint.
Extract of rose	1½ pints.
Extract of tuberose	¾ pint.
Tincture of orris root	3 pints.
Essence of rose (triple)	1½ pints.
Oil of bergamot	¾ oz.

Jockey Club, B (French formula).

Extract of cassie	1½ pints.
Extract of jasmine	2¼ pints.
Extract of rose	3 pints.
Extract of tuberose	3 pints.
Tincture of civet	½ pint.

Jockey Club, C (German formula).

Extract of cassie	1 qt.
Tincture of ambergris	13½ fl. oz.
Extract of jasmine	1 qt.
Extract of rose	1 pint.
Extract of tuberose	1 qt.
Extract of violet	1 pint.
Tincture of civet	20 fl. oz.

Oil of bergamot	¾ oz.
Oil of citronella	½ oz.
Oil of neroli	½ oz.

Jonquille (Extrait de Jonquille).

Extract of jasmine	2 qts.
Extract of orange flower	1 qt.
Extract of tuberose	2 qts.
Tincture of vanilla	½ pint.

Kiss me Quick.

Extract of cassie	1 qt.
Extract of ambergris	½ pint.
Extract of narcissus (Jonquille)	2 qts.
Tincture of tonka	1 qt.
Tincture of orris root	2 qts.
Tincture of civet	½ pint.
Essence of rose (triple)	1 qt.
Oil of citronella	75 grains.
Oil of lemon grass	45 grains.

This perfume, which was once very popular, owes its peculiar refreshing odor to the tincture of tonka beans; by increasing this ingredient the specific odor can be made more pronounced.

Bouquet Cosmopolite.

Extract of jasmine	1 pint.
Essence of lavender	½ pint.
Tincture of musk	½ pint.
Essence of patachouly	½ pint.
Extract of santal	½ pint.
Extract of tuberose	1 pint.
Tincture of vanilla	½ pint.

Extract of violet	1 qt.
Essence of rose (triple)	1 pint.
Oil of citronella	75 grains.
Oil of lemon	½ oz.

Cologne Water (Eau de Cologne).

This famous perfume, which was first made in Cologne on the Rhine, its formula being kept secret, can be produced anywhere of the same quality as the original. In order to obtain a first-class product, it is necessary, besides using the finest oils—a matter of course for all fine perfumes—to observe another special point. Every Cologne water contains oils of the citron group which develop their best odors only in true spirit of *wine*. Unless an alcohol distilled from *wine* is used, it will be impossible to make a Cologne water of really first quality. While it is possible to make a good cologne with grain or potato spirit, especially if highly rectified, comparison with one prepared from pure spirit of *wine* will at once show a marked difference. The small amount of œnanthic ether, hardly demonstrable by chemical tests but present in every spirit of wine, exerts a decided influence on the flavor.

Cologne water of the most superior and incomparable quality is made by dissolving the essential oils, excepting the oils of rosemary and neroli, in the alcohol and distilling it, the other oils being added to the distillate.

A very large number of formulas for the preparation of Cologne water have been published of which we subjoin a few. We have purposely omitted those containing many essential oils, as experience has taught us that they are of little value; for it is not the number of oils that determines the fineness of a perfume, but the manner in which certain odors are combined.

A. Finest Cologne Water (Eau de Cologne Supérieure).

Oil of bergamot	2½ oz.
Oil of lemon (hand-pressed)	6 oz.
Oil of neroli pétale	3½ oz.
Oil of neroli bigarade	1¼ oz.
Oil of rosemary	2½ oz.
Alcohol	30 qts.

B. Cologne Water (Second Quality).

Oil of bergamot	4½ oz.
Oil of lemon	4½ oz.
Oil of neroli pétale	¾ oz.
Oil of orange peel	4½ oz.
Oil of petit grain	2½ oz.
Oil of rosemary	2½ oz.
Alcohol	30 qts.

C. Cologne Water (ordinary).

Oil of bergamot	7 oz.
Oil of lemon	3½ oz.
Oil of lavender	3½ oz.
Alcohol	30 qts.

D. Cologne Water.

Oil of bergamot	1¾ oz.
Oil of lemon	3½ oz.
Oil of lavender	150 grains.
Oil of neroli	½ oz.
Oil of rosemary	75 grains.
Alcohol	30 qts.

E. Cologne Water.

Oil of bergamot	2 oz.
Oil of lemon	1 oz.
Oil of lavender	½ oz.
Oil of melissa	¼ oz.
Oil of neroli	¼ oz.
Alcohol	30 qts.

F. Cologne Water.

Oil of bergamot	3½ oz.
Oil of lemon	½ oz.
Oil of lavender	¼ oz.
Oil of melissa	½ oz.
Oil of neroli	¼ oz.
Alcohol	30 qts.

G. Cologne Water.

Oil of bergamot	1 lb.
Oil of lemon	1 lb.
Oil of lavender	6½ oz.
Oil of neroli	¾ oz.
Oil of petit grain	1½ oz.
Oil of orange peel	1 lb.
Oil of rosemary	150 grains.
Alcohol	30 qts.

H. Cologne Water.

Oil of bergamot	2¼ oz.
Oil of cajuput	½ oz.
Oil of lemon	4½ oz.
Oil of lavender	6½ oz.
Oil of neroli	2¼oz.
Oil of orange peel	4½ oz.
Oil of petit grain	½ oz.
Orange-flower water	1 qt.
Alcohol	30 qts.

The numerous formulas show that oils of lemon, bergamot, and orange form normal constituents of every Cologne water; the finer grades always contain, in addition, oils of rosemary and neroli. It is advisable to dissolve the aromatics in very strong alcohol and then to effect the dilution required with orange-flower or rose water. This dilution is also to be employed when a cheaper product is desired.

Lavender Perfumes.

English (Mitcham) oil of lavender should always be used when it is desired to produce perfumes of first quality.

Eau de Lavande Ambrée.

Oil of bergamot	1 oz.
Oil of lemon	½ oz.
Oil of geranium	75 grains.
Oil of lavender	5½ oz.
Musk	8 grains.
Peru balsam	2 oz.
Storax	4¼ oz.
Civet	15 grains.
Alcohol	10 qts.

The essential oils are dissolved in the alcohol, the other substances are macerated in the solution for one month, and the liquid decanted.

Eau de Lavande Double.

Tincture of musk	3 fl. oz.
Tincture of vanilla	3 fl. oz.
Tincture of civet	3 fl. oz.
Oil of bergamot	1¼ oz.
Oil of lemon	¾ oz.
Oil of lavender	3½ oz.
Rose water (triple)	1 qt.
Alcohol	10 qts.

Eau de Lavande a Mille Fleurs.

Tincture of ambergris	½ pint.
Essence of lavender	2 qts.
Eau de mille fleurs (see below, page 186)	2 qts.

Leap-year Bouquet.

Extract of jasmine	3 pints.
Essence of patchouly	1½ pints.
Essence of santal	1½ pints.
Extract of tuberose	1 qt.
Extract of verbena	6½ fl. oz.
Essence of vetiver	1½ pints.
Essence of rose (triple)	1½ pints.

Eau de Leipsic.

Oil of lemon	¾ oz.
Oil of neroli	¾ oz.
Oil of orange peel	150 grains.
Oil of bergamot	2¼ oz.
Oil of rosemary	75 grains.
Orange-flower water	1 qt.
Alcohol	9 pints.

Wallflower (Extrait de Giroflé).

Extract of cassie	1 pint.
Extract of orange flower	1 qt.
Extract of rose	1 qt.
Tincture of vanilla	1 pint.
Tincture of orris root	1 pint.
Oil of bitter almond	8 grains.

Lily (Extrait de Lys).

Extract of cassie	3 pints.
Extract of jasmine	13½ fl. oz.
Extract of orange flower	27 fl. oz.
Extract of rose	1 pint.

Extract of tuberose	3 qts.
Tincture of vanilla	40 fl. oz.
Oil of bitter almond	30 grains.

Eau de Lisbonne.

Oil of lemon	2¼ oz.
Oil of orange peel	4½ oz.
Oil of rose	¼ oz.
Alcohol	5 qts.

Magnolia (Extrait de Magnolia).

Extract of orange flower	2 qts.
Extract of rose	4 qts.
Extract of tuberose	1 qt.
Extract of violet	1 qt.
Oil of bitter almond	40 grains.
Oil of lemon	15 grains.

Lily of the Valley.

Oil of bitter almond	150 grains.
Extract of jasmine	7 oz.
Extract of neroli	7 oz.
Extract of cassie	14 oz.
Extract of tuberose	28 oz.
Alcohol	28 oz.

Lily of the Valley Extract.

Extract of jasmine	3½ oz.
Extract of ylang-ylang (see below, p. 198)	½ oz.
Cardamom seed, crushed	75 grains.
Oil of orris	10 drops.

Macerate for a week, and filter.

The amount of cardamom seed is to be weighed exactly; should its odor still be too pronounced, extract of jasmine should be gradually added until the right aroma is obtained.

Bouquet a la Maréchale.

Tincture of ambergris	½ pint.
Tincture of musk	½ pint.
Extract of neroli	1 pint.
Extract of orange flower	1 qt.
Tincture of tonka	1 pint.
Tincture of vanilla	1 pint.
Tincture of orris root	1 pint.
Essence of vetiver	1 pint.
Essence of rose (triple)	1 qt.
Oil of clove	75 grains.
Oil of santal	75 grains.

A la Mode.

Extract of cassie	1 qt.
Extract of jasmine	1 qt.
Extract of orange flower	1 qt.
Extract of tuberose	1 qt.
Tincture of civet	1 pint.
Oil of bitter almond	75 grains.
Oil of nutmeg	60 grains.

A. Eau de Mille Fleurs.

Extract of cassie	1 pint.
Essence of cedar	1 pint.
Extract of jasmine	1 pint.
Tincture of musk	6 fl. oz.

Extract of neroli	1 pint.
Extract of patchouly	1 pint.
Tincture of vanilla	1 pint.
Extract of violet	1 pint.
Essence of vetiver	1 pint.
Tincture of civet	6 fl. oz.
Oil of lemon	½ oz.
Oil of geranium	¾ oz.
Oil of lavender	¾ oz.
Oil of orange peel	½ oz.

B. Eau de Mille Fleurs.

Extract of cassie	1 pint.
Tincture of ambergris	½ pint.
Essence of cedar	½ pint.
Extract of jasmine	1 pint.
Tincture of musk	½ pint.
Extract of orange flower	1 pint.
Extract of rose	1 pint.
Extract of tuberose	1 pint.
Tincture of vanilla	½ pint.
Extract of violet	1 pint.
Essence of rose (simple)	1 qt.
Oil of bergamot	1¼ oz.
Oil of bitter almond	24 grains.
Oil of clove	24 grains.
Oil of neroli	24 grains.

C. Eau de Mille Fleurs a Palmarose.

Extract of cassie	6 fl. oz.
Essence of cedar	3 fl. oz.
Tincture of musk	3 fl. oz.

Extract of violet	6 fl. oz.
Oil of bergamot	1½ oz.
Oil of cedar	1¾ oz.
Oil of lemon	¼ oz.
Oil of lavender	¼ oz.
Oil of clove	¼ oz.
Oil of palmarosa	½ oz.
Alcohol	9 pints.

Fleurs de Montpellier.

Tincture of ambergris	10 fl. oz.
Tincture of musk	10 fl. oz.
Extract of rose	3 pints.
Extract of tuberose	3 pints.
Essence of rose (triple)	3 pints.
Oil of bergamot	1¾ oz.
Oil of clove	¼ oz.

Fleurs des Champs.

Extract of cassie	3½ oz.
Extract of jasmine	3½ oz.
Tincture of musk	3½ oz.
Tincture of tonka	3 pints.
Tincture of orris root	7 oz.
Oil of geranium	1½ oz.
Oil of neroli	1½ oz.
Oil of rose	⅞ oz.
Alcohol	3 qts.

Huile de Mille Fleurs.

(For perfuming hair oils and pomades.)

Oil of cinnamon	10 drops.
Oil of neroli	20 drops.
Oil of rose	20 drops.
Oil of clove	—
Oil of orange peel	15 grains.
Oil of calamus	20 drops.
Oil of geranium	150 grains.
Oil of lemon	½ oz.
Oil of bergamot	2½ oz.
Oil of verbena	75 grains.

Musk (Extrait de Musc).

Tincture of ambergris	3 pints.
Tincture of musk	3 qts.
Extract of rose	1½ pints.

Mousseline.

Extract of cassie	1 qt.
Extract of jasmine	1 qt.
Extract of rose	1 qt.
Extract of tuberose	1 qt.
Bouquet à la maréchale	2 qts.
Oil of santal	¾ oz.

Myrtle (Extrait de Myrthe).

Extract of jasmine	½ pint.
Extract of orange flower	1 qt.
Extract of rose	2 qts.
Extract of tuberose	1 qt.
Tincture of vanilla	1 qt.

Narcissus (Extrait de Narcisse).

Extract of jonquille	2 qts.
Extract of tuberose	3 qts.
Tincture of storax	½ pint.
Tincture of tolu	½ pint.

Navy's Nosegay.

Extract of rose	1 qt.
Extract of orange flower	1 qt.
Essence of patchouly	3 fl. oz.
Extract of verbena	6 fl. oz.
Essence of vetiver	6 fl. oz.
Oil of bitter almond	150 grains.
Oil of citronella	¾ oz.
Oil of nutmeg	75 grains.

New-Mown Hay.

Tonka beans, in pieces	75 grains.
Orris root	150 grains.
Vanillin	8 grains.
Oil of bergamot	30 drops.
Oil of neroli	2 drops.
Oil of rose	2 drops.
Oil of lavender	2 drops.
Oil of clove	1 drop.
Patchouly herb	3 grains
Benzoic acid	8 grains.
Nettle herb	30 grains.
Alcohol	7½ oz.

Digest for two weeks, and filter.

Pink (Extrait d'Œillet).

Extract of cassie	2½ pints.
Extract of orange flower	2½ pints.
Extract of rose	5 pints.
Tincture of vanilla	20 fl. oz.
Oil of clove	75 grains.

Essence of Sweet Pea.

Extract of tuberose	1 qt.
Extract of orange flower	1 qt.
Extract of rose	1 qt.
Tincture of vanilla	5½ oz.

Polyanthus.

Extract of rose	1 qt.
Extract of jasmine	1 pint.
Extract of violet	½ pint.
Tincture of musk	2½ fl. drachms.
Oil of neroli	¾ oz.
Oil of lemon	¾ oz.
Alcohol	2 qts.

Eau du Portugal.

Oil of bergamot	1 oz.
Oil of lemon	2¼ oz.
Oil of orange peel	½ lb.
Oil of rose	¼ oz.
Alcohol	5 qts.

Queen Victoria's Perfume.

Extract of cassie	10 fl. oz.
Extract of rose	5 pints.

Extract of orange flower	20 fl. oz.
Extract of tuberose	2½ pints.
Extract of violet	5 pints.
Tincture of civet	3 fl. oz.
Oil of bergamot	¾ oz.
Oil of citron	150 grains.

Patchouly (Extrait de Patchouli).

Oil of patchouly	1½ oz.
Oil of rose	150 grains.
Alcohol	5 qts.

Essence of Reseda.

(Artificial, almost indistinguishable from the genuine.)

Tonka beans, in pieces	30 grains.
Storax, liquid	15 grains.
Orris root	1¾ oz.
Oil of neroli	10 drops.
Oil of rose	10 drops.
Oil of bitter almond	2 drops.
Oil of bergamot	20 drops.
Ambergris	15 grains.
Musk	8 grains.
Nettle herb	30 grains.
Alcohol	½ lb.

Macerate for from one to two weeks, and filter.

Rondeletia Odoratissima.

Tincture of ambergris	4¼ oz.
Tincture of musk	4¼ oz.
Tincture of vanilla	4¼ oz.

Oil of bergamot	1 oz.
Oil of lavender	2¼ oz.
Oil of clove	1¼ oz.
Oil of rose	75 grains.
Alcohol	4 qts.

The odor of Rondeletia has not thus far been isolated, at least in Europe (the plant is indigenous to the Antilles). The oils of lavender and clove together constitute the odor known in perfumery as Rondeletia. By increasing the quantity of the two oils, the strength of the perfume may be heightened.

Royal Nosegay.

Tincture of ambergris	2½ oz.
Extract of jasmine	1 qt.
Tincture of musk	3 fl. oz.
Extract of rose	1 qt.
Tincture of vanilla	½ pint.
Extract of violet	1 qt.
Essence of vetiver	½ pint.
Oil of bergamot	75 grains.
Oil of clove	1¾ oz.

Rose Odors.

The art of perfumery has endeavored to fix this most magnificent of all odors, and we must confess that in this case it has succeeded in solving the problem in a manner unequalled in any other perfume. We are able to imitate not only the pure rose odor, but also those of its several varieties such as the tea rose, moss rose, etc., both as to character and intensity. Fine rose odors can be produced in their full fragrance only from pomade extracts; the various rose oils furnish inferior products.

Rosa Centifolia, A (Finest Quality).

Essence of rose (triple)	1 qt.
Rose pomade	8 lbs.
Alcohol	5 qts.

Rose, B (less fine).

Oil of rose	3½ oz.
Alcohol	5 qts.

China Rose (Roses Jaunes).

Essence of rose (triple)	2 qts.
Tincture of tonka	½ pint.
Extract of tuberose	2 qts.
Extract of verbena	½ pint.

Dog Rose (Eglantine).

Extract of cassie	2½ pints.
Extract of orange flower	2½ pints.
Extract of rose	5 pints.
Essence of rose (triple)	2½ pints.
Oil of lemon-grass	¼ oz.
Oil of neroli	¼ oz.

Moss Rose (Rose Mousseuse).

Extract of rose	2 qts.
Extract of orange flower	1 qt.
Essence of rose (triple)	1 qt.
Tincture of ambergris	1 pint.
Tincture of musk	½ lb.

Tea Rose (Rose Théa).

Extract of rose	1 qt.
Extract of geranium	1 qt.

Extract of orange flower	½ pint.
Essence of rose (triple)	1 qt.
Extract of santal	½ pint.
Tincture of orris root	½ pint.

White Rose (Roses Blanches).

Extract of rose	1 qt.
Extract of jasmine	1 pint.
Extract of violet	1 qt.
Essence of patchouly	½ pint.
Essence of rose (triple)	1 qt.

White Rose.

Oil of rose	15 drops.
Patchouly herb	3 grains.
Musk	3 grains.
Cologne spirit	7 oz.

Twin Rose (Roses Jumelles).

Extract of rose	5 qts.
Oil of rose	1¾ oz.

Spring Nosegay.

Extract of cassie	1 qt.
Tincture of ambergris	13½ fl. oz.
Essence of geranium	1 qt.
Extract of jasmine	1 qt.
Extract of orange flower	2 qts.
Tincture of musk	10 fl. oz.

Suave.

Extract of cassie	1 qt.

Tincture of ambergris	¼ pint.
Extract of jasmine	1 qt.
Tincture of musk	¼ pint.
Extract of rose	1 qt.
Extract of tuberose	1 qt.
Tincture of vanilla	¾ pint.
Oil of bergamot	½ oz.
Oil of clove	30 grains.
Oil of mace	30 grains.

Heliotrope Bouquet (Fleurs Solsticiales).

Extract of cassie	13½ fl. oz.
Tincture of ambergris	5 fl. oz.
Extract of jasmine	2½ pints.
Tincture of musk	5 fl. oz.
Extract of rose	5 pints.
Extract of violet	2½ pints.
Extract of verbena	13½ fl. oz.
Essence of rose (triple)	2½ pints.
Oil of bergamot	1½ oz.
Oil of lemon	1½ oz.

Bouquet de Stamboul.

Extract of rose	2½ pints.
Extract of cassie	1 qt.
Extract of jasmine	1 qt.
Extract of tuberose	1 pint.
Tincture of civet	½ pint.
Oil of bitter almond	150 grains.

Syringa.

Extract of reseda 1¾ oz.

Extract of violet	3½ oz.
Patchouly herb	5 grains.
Benzoic acid	8 grains.
Oil of orris	10 drops.
Alcohol	1¾ oz.

Tulipe Odoriférante.

Extract of cassie	6 fl. oz.
Extract of jasmine	1 qt.
Extract of rose	1 pint.
Extract of tuberose	1 qt.
Tincture of orris root	1 qt.
Oil of bitter almond	15 grains.
Oil of neroli	30 grains.

Hungarian Water (Eau Hongroise).

Extract of orange flower	1 pint.
Essence of rose (triple)	1 pint.
Oil of lemon	1 oz.
Oil of melissa	1 oz.
Oil of peppermint	30 grains.
Oil of rosemary	2 oz.
Alcohol (from wine)	5 qts.

Bouquet de Virginie.

Essence of geranium	1 pint.
Tincture of musk	1 qt.
Extract of orange flower	1 qt.
Extract of santal	1 pint.
Tincture of tonka	1 qt.
Tincture of vanilla	1 qt.
Essence of rose (triple)	1 pint.

Violet (Violettes).

Violet pomade	6 to 7 lb.
Extract of cassie	6 fl. oz.
Alcohol	5 qts.

This is the finest among the true violet perfumes. Less fine, though still of prime quality, is the following:

Extract of cassie	2 qts.
Extract of rose	1 qt.
Extract of tuberose	1 qt.
Tincture of orris root	1 qt.
Oil of bitter almond	15 grains.

Verbena A (Extrait de Verveine).

Oil of lemon grass	½ oz.
Oil of lemon	14 oz.
Oil of orange peel	3½ oz.
Alcohol	5 qts.

A cheap and pleasant perfume: the following is far superior.

Verbena B.

Oil of lemon	10½ oz.
Oil of lemon grass	6 oz.
Oil of orange peel	5 oz.
Extract of orange flower	2 lb.
Extract of rose	3 lb.
Extract of tuberose	2 lb.
Alcohol	5 qts.

This "Extract of Verbena B" is a modification of that given previously, on page 164.

Extrait de Verveine C.

Extract of orange flower	30 fl. oz.
Extract of rose	1 qt.
Extract of tuberose	30 fl. oz.
Oil of lemon	1 oz.
Oil of lemon grass	¾ oz.
Oil of orange peel	¼ lb.
Alcohol	4½ pints.

Violettes des Montagnes.

Extract of cassie	13½ fl. oz.
Extract of jasmine	13½ fl. oz.
Extract of rose	13½ fl. oz.
Extract of violet	2 qts.
Tincture of orris root	13½ fl. oz.
Oil of bitter almond	30 grains.

Volcameria.

Extract of jasmine	1 pint.
Extract of rose	1 qt.
Extract of tuberose	2 qts.
Extract of violet	2 qts.
Tincture of musk	½ pint.

Forest Breeze (Pine-Needle Odor.)

Oil of turpentine	14 oz.
Oil of lavender	1½ oz.
Oil of lemon grass	¾ oz.
Alcohol	5 qts.

The oil of turpentine must be clear like water, and most carefully rectified. If it can be obtained of good quality, the oil distilled from the leaves or needles of

Pinus sylvestris, commonly known as pine-needle oil or fir-wool oil, is to be preferred for this purpose. Still better is the oil obtained from Pinus Pumilio.

West End.

Extract of cassie	1 qt.
Tincture of ambergris	½ pint.
Extract of jasmine	1 qt.
Tincture of musk	½ pint.
Extract of tuberose	1 qt.
Extract of violet	1 qt.
Essence of rose (triple)	3 pints.
Oil of bergamot	1 oz.
Oil of lemon	75 grains.

Wintergreen.

Extract of cassie	1 qt.
Tincture of ambergris	1 pint.
Extract of lavender	1 pint.
Extract of orange flower	1 qt.
Extract of rose	2 qts.
Tincture of vanilla	1 pint.
Essence of vetiver	1 pint.

Flowers of the Isle of Wight.

Extract of rose	1 qt.
Extract of santal	2 qts.
Tincture of orris root	1 qt.
Essence of vetiver	1 pint.

Yacht Club.

Extract of cassie	6 fl. oz.
Extract of jasmine	1 qt.

Extract of orange flower	2 qts.
Extract of santal	2 qts.
Tincture of vanilla	1 pint.
Essence of rose (triple)	1 qt.
Benzoic acid, sublimed	1½ oz.

The characteristic odor of this perfume depends upon the volatile oil adhering to the sublimed benzoic acid; for this reason no other benzoic acid should be used than that obtained by sublimation.

Ylang-Ylang.

Cologne water	4 qts.
Essence of rose (triple)	1 qt.
Tincture of vanilla	3½ oz.
Tincture of tolu	14 oz.
Oil of neroli	75 grains.
Oil of ylang-ylang	¾ oz.

Appendix.

The great majority of the above-described perfumes are made with extracts prepared from pomades; hence their cost of production is considerable and the selling-price high. For the requirements of the middle classes, quite fragrant perfumes are manufactured by dissolving the cheaper essential oils in ordinary alcohol, and various new odors can be obtained by mixing several of them. The extracts made with cheap oils are well suited to this purpose. The oils most frequently used for such articles are those of bergamot, lemon, orange peel, lavender flowers (French), lemon grass, nutmeg, clove, and santal. The alcohol must be free from fusel oil and have a strength of at least 70% Tralles.

Oils with not very intense odor are generally used in the proportion of about 2 to 2½ ounces to the quart of alcohol; half that quantity will suffice for strong-scented oils such as those of lemon-grass, clove, and nutmeg.

From these simple solutions an experienced manufacturer can produce very nice perfumes by mixing them in due proportions; they are comparatively cheap, and sometimes they yield relatively more profit than the finest articles, whose

contents and containers generally represent a considerable outlay on the part of the manufacturer.

CHAPTER XV.
AMMONIACAL AND ACID PERFUMES.

A. Ammoniacal Perfumes.

Ammonia (ammonia water) has a disagreeable odor and exerts a very caustic effect on the lachrymal glands. Despite these properties, ammonia, in a highly dilute condition and mixed with other aromatics, finds manifold application in perfumery and serves particularly for the manufacture of the so-called smelling salts, or inexhaustible salts, used for filling smelling bottles.

The liquid or caustic ammonia, however, is not so suitable for the purposes of the perfumer as the carbonate of ammonia, which when pure forms colorless crystals usually covered with a white dust (consisting of bicarbonate of ammonia); these, undergoing gradual decomposition, give off the odor of ammonia and hence are more lasting in smelling bottles than the pure liquid ammonia.

The main essential for both of these substances is purity. Caustic ammonia as well as carbonate of ammonia are now obtained on a large scale from "gas liquor," but the crude products always retain some of the penetrating odor of coal tar which renders them valueless for the purposes of the perfumer. We must, therefore, make it a rule to use nothing but perfectly pure materials which, moreover, are easily to be had in the market.

Inexhaustible Salt (Sel Inépuisable).

Oil of bergamot	24 grains.
Oil of lavender	45 grains.
Oil of mace	24 grains.
Oil of clove	24 grains.
Oil of rosemary	45 grains.
Water of ammonia	1 qt.

The aromatics are placed in a bottle, the ammonia is added, and the bottle vigorously shaken; the solution is soon effected, and the turbid liquid can be at once filled into bottles.

According to the material from which the containers are made, different methods must be adopted. It is necessary to give the liquid such form as to prevent its flowing out when the vessel is inverted; this is important, as the bottles are often carried in dress pockets and the ammonia destroys most colors. As a rule the vessels are filled with indifferent porous substances which are moistened with the perfume. If the container is made of box wood, ivory, porcelain, or some other opaque material, it is filled with fibres of asbestos or with very small pieces of sponge, and as much perfume is poured in as the substance can take up; the vessels are then inverted into a porcelain plate and allowed to drain, and are finally closed with a loose plug of cotton. If the container is transparent, it is better to use, instead of the asbestos or sponge which do not look neat, either small pieces of white pumice stone, powdered glass, small white glass beads, or crystals of sulphate of potassium which is insoluble in the perfume.

White Smelling Salt (Sel Blanc Parfumé).

While the first-named ammoniacal preparation is called a salt, it is really nothing but perfumed caustic ammonia; but white smelling salt is what its name indicates and can be perfumed as desired by the consumer; but as only certain scents harmonize with ammonia, not every odor can be employed; the most appropriate are oils whose odor resembles that of rose, and the oils of nutmeg and cinnamon.

Mix in a large porcelain jar—

Carbonate of ammonia	2 lb.
Caustic ammonia	1 lb.

Cover the jar and leave it at rest. After some days the mixture will have changed into a firm mass of monocarbonate of ammonia which is rubbed to a coarse powder, perfumed, and filled into bottles. The above quantities require:

Oil of bergamot	15 grains.
Oil of lavender	15 grains.
Oil of nutmeg	8 grains.
Oil of clove	8 grains.
Oil of rose	8 grains.
Oil of cinnamon	75 grains.

The oils are poured into a mortar and rubbed up with about one-tenth of the salt; of this perfumed salt enough is added to the several portions of the mass, and triturated until the odor is equally distributed. For cheaper smelling salts oils of geranium and cassia may be substituted for the oils of rose and cinnamon.

Preston Salt (Sel Volatil).

In this perfume ammonia is continually generated; the salt is prepared by mixing chloride of ammonium or sal-ammoniac in fine powder with freshly slaked lime. Fine or cheap perfume is added, according to the grade desired. The mixture of sal-ammoniac and slaked lime continually develops small amounts of ammonia—it takes a long time until the decomposition is complete, and for this reason a bottle filled with Preston salt retains the odor of ammonia for several years.

Eau de Luce.

This is the only ammoniacal perfume used in a liquid form. It is made according to the following formula:

Tincture of ambergris	10½ oz.
Tincture of benzoin	½ lb.
Oil of lavender	150 grains.
Water of ammonia	1½ lb.

The tinctures are mixed with the ammonia by agitation and immediately filled into bottles; the liquid should have a milky appearance. At times 150 grains of white soap is added which aids in imparting to the liquid the desired milky appearance. In fine eau de Luce the odor of ambergris should predominate; this can be easily effected by increasing the amount of tincture of ambergris.

B. Acid Perfumes.

As there is a group of perfumes which is distinguished by their characteristic odor of ammonia and which we have therefore called ammoniacal, so there is an important series of articles containing acetic acid which are used cosmetically as so-called toilet vinegars, and in some washes.

Ordinary vinegar, *i.e.*, water containing four to six per cent of acetic acid, has, as is well known, a not unpleasant refreshing odor and a pure acid taste. Pure

acetic acid, now made in large quantities and of excellent quality, is known commercially as glacial acetic acid. In commerce, it is customary to designate any acetic acid containing 85 or more per cent of the absolute acid, as glacial acetic acid. In chemical or pharmacopœial nomenclature, however, the glacial acid is meant to be as near 100% as possible. In perfumery, an 85% acid is sufficiently strong. It forms a colorless liquid with a narcotic odor and an intensely acid taste; it congeals into glassy crystals at a temperature of 8.5° C. (47° F.). The latter property is of importance as showing the purity of the acid. Concentrated acetic acid, like alcohol, dissolves aromatic substances, with which it forms perfumes which differ from those made with alcohol mainly by their peculiar refreshing after-odor which is due to the acetic acid.

Acetic acid can be saturated with various odors and thus furnish fine perfumes; but for so-called toilet vinegars which are used as washes the acetic acid must be properly diluted, since the concentrated acid has pronounced caustic properties, reddens the skin, and may even produce destructive effects on sensitive parts such as the lips.

Aromatic Vinegar (Vinaigre Aromatique).

Glacial acetic acid	2 lb.
Camphor	4¼ oz.
Oil of lavender	¾ oz.
Oil of mace	150 grains.
Oil of rosemary	150 grains.

Instead of the perfumes here given, finer odors may be employed for the production of superior toilet vinegars; thus we find vinaigre ambré, au musc, à la violette, au jasmin, etc., according to the perfume used. As concentrated acetic acid dissolves most aromatic substances the same as alcohol, all alcoholic perfumes may have their counterparts in acetic acid; but the aromatics should never be added in so large amount as to mask the characteristic odor of the acetic acid. A very pleasant vinegar may be produced by combining an alcoholic with an acid perfume, as in the following:

Spiced Vinegar (Vinaigre aux Épices).

1. Macerate:

    Leaves of geranium, lavender, peppermint,

rosemary, and sage, of each	1 oz.
In alcohol of 80%	1 lb.

2. Macerate:

Angelica root, calamus root, camphor, mace, nutmeg, cloves, of each	½ oz.
In glacial acetic acid	2 lb.

for two weeks, mix the liquids, and filter them into a bottle which should not be completely filled. The longer this mixture is allowed to season in the bottle, the finer will be the aroma; for in the course of time the alcohol and acetic acid react on each other and form acetic ether, which likewise possesses a pleasant aromatic odor.

Certain aromatic vinegars, like ammoniacal perfumes, are filled into smelling bottles containing the same porous substances for their absorption, namely, sponge, pumice stone, crystals of potassium sulphate, etc.

FORMULAS FOR TOILET VINEGARS.

Vinaigre a la Rose.

Essence of rose (triple)	10½ oz.
White-wine vinegar	1 qt.

This should be colored a pale rose tint with one of the dye-stuffs to be enumerated hereafter. The use of true wine vinegar is to be recommended for this and all the following toilet vinegars, as the œnanthic ether it contains has a favorable effect on the fineness of the odor.

Vinaigre aux Fleurs d'Oranges.

Extract of orange flower	7 oz.
White-wine vinegar	1 qt.

This is usually left colorless.

Vinaigre aux Violettes.

Extract of cassie	8 oz.
Extract of orange flower	3½ oz.

Tincture of orris root	5½ oz.
Essence of rose (triple)	5½ oz.
White-wine vinegar	1 qt.

Vinaigre de Quatre Voleurs.

Leaves of lavender, peppermint, rue, rosemary, and cinnamon, of each	3¼ oz.
Calamus, mace, nutmeg, of each	150 grains.
Camphor	¾ oz.
Macerated in alcohol	7 oz.
And acetic acid	4¾ lb.

Preventive Vinegar (Vinaigre Hygiénique).

Benzoin	2¼ oz.
Lavender	¾ oz.
Cloves	150 grains.
Marjoram	¾ oz.
Cinnamon	150 grains.
Alcohol	1 qt.
White-wine vinegar	2 qts.

Macerate the solids with the alcohol and vinegar.

Vinaigre de Cologne.

Cologne water	1 qt.
Glacial acetic acid	1¾ oz.

As this vinegar is made by mixing an alcoholic perfume with acetic acid, so all other alcoholic perfumes may be employed for a like purpose; but the quantities must be determined by experiment, for the various aromatics differ in the intensity of their odor.

Vinaigre éthéré.

Glacial acetic acid	14 oz.

Acetic ether	1½ oz.
Nitrous ether	¾ oz.
Water	5 qts.

The water should be added after the ethers have been dissolved in the glacial acetic acid.

Vinaigre de Lavande.

Lavender water	4 qts.
Rose water	1 pint.
Glacial acetic acid	½ lb.

To be stained a bluish color with indigo-carmine.

Orange-Flower Vinegar.

Orange-flower water	4 qts.
Glacial acetic acid	7 oz.

Mallard's Toilet Vinegar.

Tincture of benzoin	1½ oz.
Tincture of tolu	1½ oz.
Oil of bergamot	150 grains.
Oil of lemon	150 grains.
Oil of neroli	30 grains.
Oil of orange peel	½ oz.
Oil of lavender	15 grains.
Oil of rosemary	15 grains.
Tincture of musk	15 grains.
Concentrated acetic acid	21 oz.
Alcohol	4¾ lb.

Toilet Vinegar (French Formula).

Oil of bergamot	30 grains.
Oil of lemon	30 grains.

Oil of rose	8 drops.
Oil of neroli	5 drops.
Benzoin	75 grains.
Vanillin	15 grains.
Concentrated acetic acid	½ oz.
Alcohol	½ lb.

Macerate for two weeks, and filter.

Vinaigre Polyanthe.

Glacial acetic acid	7 oz.
Tincture of benzoin	1¾ oz.
Tincture of tolu	1¾ oz.
Oil of neroli	150 grains.
Oil of geranium	150 grains.
Water	2 qts.

To be stained with tincture of krameria (rhatany).

CHAPTER XVI.
DRY-PERFUMES.

As a matter of course, dry perfumes are of greater antiquity than fluid; aromatic substances require merely to be dried in order to retain their fragrance permanently. The oldest civilized people known in history—Egyptians, Assyrians, Persians, Babylonians, and the Jews, as numerous passages in the Bible prove—used dried portions of plants, leaves, flowers, and resins as perfumes and incense.

To this day there is kept up quite a trade in Valeriana celtica, a strong-scented Alpine plant, and in powdered amber, with the Orient, where they are used for scent bags and incense respectively. The Catholic Church retains to the present time the Jewish rite of burning incense, and in our museums will be found urns, taken from Egyptian graves, from which pleasant odors escape even now after nearly four thousand years, owing to the aromatic resins with which they are filled. It is said, too, that the delightful volatile odors of our handkerchief perfumes were first prepared by an Italian named Frangipanni conceiving the idea of treating a dry mixture of different aromatic plants with alcohol and thus imparting the odor they contained to the latter.

Not all aromatics can be made into sachet powders; it is well known that the delightful odor of violets changes into a positively disagreeable smell when the flowers are dried, and the same remark applies to the blossoms of the lily of the valley, mignonette, lily, and most of our fragrant plants. On the other hand, some portions of plants, especially those in which the odorous principle is contained not only in the flower but in all parts of the plant, as in the mints, sage, and most Labiatæ, remain fragrant for a long time after drying and hence can be employed for sachets. Besides the plants named, lavender, rose leaves, the leaves of the lemon and orange tree, Acacia farnesiana, patchouly herb, and some other plants continue fragrant after drying.

Any vegetable substance to be used for sachets must be completely dried so as to prevent mould. The drying should be effected in a warm, shady place, sometimes in heated chambers; direct sunlight and excessive heat injure the strength of the odor, a portion of the aromatics becoming resinified and volatilized. If artificial heat is employed, a temperature between 40 and 45° C. (104-113° F.) is most suitable.

The external form of this class of preparations varies of course with the public for which it is intended. Expensive sachets are sold in silk bags with different ornamentation; those intended for the Orient are generally put up as small silk cushions richly ornamented with gold and colors to suit Oriental taste. Cheap sachets are sold in envelopes or in round boxes. It is customary to have the ingredients ground or finely powdered, for which purpose small hand-mills will generally suffice.

CHAPTER XVII.
FORMULAS FOR DRY PERFUMES (SACHETS).

Ceylon Sachet Powder.

Mace	23 oz.
Patchouly	28 oz.
Vetiver root	35 oz.
Oil of orange peel	1¾ oz.
Oil of peppermint	3½ oz.

Cyprian Sachet Powder.

Cedar wood	2 lb.
Rhodium	2 lb.
Santal wood	2 lb.
Oil of rhodium	½ oz.

The oil is mixed with the finely powdered or rasped woods and distributed in the mass by trituration.

Field Flower Sachet Powder.

Calamus root	1 lb.
Caraway	½ lb.
Lavender	1 lb.
Marjoram	½ lb.
Musk	30 grains.
Cloves	2¾ oz.
Peppermint	½ lb.
Rose leaves	1 lb.
Rosemary	3½ oz.
Thyme	½ lb.

Frangipanni Sachet Powder.

Musk	1 oz.
Sage	½ lb.
Santal wood	½ lb.
Orris root	6 lb.

Vetiver	½ lb.
Civet	¼ oz.
Oil of neroli	75 grains.
Oil of santal	75 grains.
Oil of rhodium	75 grains.

Heliotrope Sachet Powder.

Musk	½ oz.
Rose leaves	2 lb.
Tonka beans	1 lb.
Vanilla	½ lb.
Orris root	4 lb.
Oil of bitter almond	30 grains.

Indian Sachet Powder.

Santal wood	3½ oz.
Orris root	21 oz.
Cinnamon	10½ oz.
Oil of lavender	75 grains.
Cloves	30 grains.
Oil of rose	150 grains.

Lavender Sachet Powder.

Benzoin	1 lb.
Lavender flowers	4 lb.
Oil of lavender	1 oz.
Oil of rose	75 grains.

Marshal Sachet Powder.

Cassia	½ lb.
Musk	75 grains.

Cloves	½ lb.
Rose leaves	½ lb.
Santal wood	1 lb.
Orris root	1 lb.

Mille Fleurs Sachet Powder.

Benzoin	1 lb.
Lavender	1 lb.
Musk	30 grains.
Cloves	4½ oz.
Allspice	2½ oz.
Rose leaves	1 lb.
Santal wood	4¼ oz.
Tonka beans	4¼ oz.
Vanilla	4½ oz.
Orris root	1 lb.
Civet	30 grains.
Cinnamon	½ oz.

Muslin Sachet Powder.

Benzoin	½ lb.
Santal wood	1 lb.
Thyme	1 lb.
Orris root	1 lb.
Vetiver root	2 lb.
Oil of geranium	75 grains.

Olla Podrida.

This name is applied in Spain to a dish prepared from various remnants of food. The olla podrida of the perfumer is made from the remnants of the aromatic vegetable substances after their extraction with alcohol, petroleum ether, etc. Although vanilla, cinnamon, nutmeg, etc., be repeatedly extracted,

they still retain their characteristic odor, though somewhat fainter, and thus they can be used with advantage for sachet powders intended for filling bags, cushions, etc. If mixed in corresponding proportions, they can be made use of for all the sachets here enumerated. No definite formula can be given for a peculiar dry perfume to be called Olla podrida; the olfactory organ is the best guide.

Patchouly Powder.

Patchouly herb	2 lb.
Oil of patchouly	30 grains.
Musk	15 grains.

The musk is rubbed up with gradually increased quantities of the patchouly herb and with the addition of the oil of patchouly; the intimate mixture of the powder saturated with musk and oil of patchouly and the rest of the powder is effected by prolonged stirring of the two powders in a large vessel. The same process is followed with all other dry powders in which a small amount of a solid with intense odor or of an essential oil is to be mixed with a large quantity of powder.

Persian Sachet Powder.

Musk	30 grains.
Rose leaves	1 lb.
Tonka beans	3½ oz.
Orris root	2 lb.
Oil of nutmeg	75 grains.
Oil of clove	75 grains.
Oil of rose	150 grains.
Oil of cinnamon	75 grains.

Portugal Powder.

Lemon peels	1 lb.
Orange peels	2 lb.
Orris root	1 lb.
Cinnamon	3½ oz.

Oil of lemon grass	150 grains.
Oil of neroli	150 grains.
Oil of orange peel	2½ oz.

Potpourri.

Many widely differing perfumes are sold in the market under this name; a good formula for its preparation is the following:

Lavender	1 lb.
Cloves	2½ oz.
Allspice	2½ oz.
Rose leaves	1 lb.
Reseda	1¾ oz.
Orris root	½ lb.
Vanilla	150 grains.
Cinnamon	1¾ oz.
Sand, or table salt, etc.	1 lb.

The admixture of fine white sand, table salt, or powdered glass or marble, etc., is made merely for the purpose of increasing the weight.

Rose Sachet Powder, A.

Geranium herb	3½ oz.
Rose leaves	2 lb.
Santal wood	1 lb.
Oil of rose	½ oz.

Rose Sachet Powder, B.

Rose leaves	2 lb.
Santal wood	1 lb.
Oil of rose	1 oz.

Santal Powder,

which is simply finely rasped santal wood, is also sometimes sold as rose sachet powder when it has received an addition of some oil of geranium.

Violet Sachet Powder.

Benzoin	½ lb.
Musk	30 grains.
Orange flowers	1¾ oz.
Rose leaves	1 lb.
Orris root	2 lb.
Oil of bitter almond	75 grains.
Oil of lemon grass	30 grains.

Violet Sachet Powder.

Orris root, powdered	1 lb.
Musk	8 grains.
Vanillin	30 grains.
Oil of rose	25 drops.
Oil of petit grain	150 grains.
Cologne water	3½ oz.

Mix intimately in a porcelain mortar.

Verbena Sachet Powder.

Lemon peels	1 lb.
Caraway	½ lb.
Orange peels	1 lb.
Oil of bergamot	1¾ oz.
Oil of lemon	1¾ oz.
Oil of lemon grass	75 grains.

Vetiver Sachet Powder.

Vetiver root 2 lb.

Musk	15 grains.
Civet	20 grains.

CHAPTER XVIII.
THE PERFUMES USED FOR FUMIGATION.

According to the use made of them, perfumes for fumigation may be divided into two groups: those which develop their fragrance on being burned, and those which do so on being merely heated. The former group includes pastils and ribbons, the latter fumigating powders and waters.

Fumigating Pastils.

***French*—Pastilles fumigatoires; *German*—Räucherkerzen.**

Pastils consist in the main of charcoal to which enough saltpetre is added to make the lighted mass glow continuously and leave a pure white ash. To this mass are added various aromatic substances which are gradually volatilized by the heat and fill the surrounding air with their perfume. It is important to observe that only ordinary saltpetre (nitrate of potassium) is to be used for this purpose, and not the so-called Chili saltpetre (nitrate of sodium) which becomes moist in the air. For ordinary pastils finely rasped fragrant woods such as cedar or santal are frequently employed. During the slow combustion, however, the wood gives off products of a pungent or disagreeable odor such as acetic acid and empyreumatic products, which lessen the fragrance. Fine pastils are composed of resins and essential oils and are usually formed into cones two-fifths to four-fifths of an inch high, by being pressed in metal moulds.

Fumigating pastils are manufactured as follows. Each solid ingredient is finely powdered by itself, and the necessary quantities are then put into a wide porcelain dish and intimately mixed with a flat spatula. In order to confine the dust, the dish is covered with a cloth during this operation. The mixture being completed, the essential oils are added, together with enough mucilage of acacia to form a plastic mass to be kneaded with the pestle, and which after drying will have a sufficiently firm consistence.

Pastilles Orientales.

Charcoal	1½ lb.
Saltpetre	3½ oz.
Benzoin	½ lb.

Powdered amber	3½ oz.
Tolu balsam	2¾ oz.

The charcoal for this and all other pastils should be made from soft woods (willow, poplar, etc.). The characteristic of these pastils is the amber they contain (the offal from manufactories is used) and which on ignition gives off a peculiar odor much prized in the Orient, rather than in Europe or America.

Pastilles du Sérail.

Charcoal	1½ lb.
Saltpetre	3½ oz.
Benzoin	½ lb.
Santal wood	5½ oz.
Opium	1¾ oz.
Tolu balsam	2¾ oz.

This formula is here given as usually quoted. It may be stated, however, that the opium may be omitted entirely, as it neither contributes to the fragrance, nor produces, by being burned in this manner, any of the supposed exhilarating or intoxicating effects which it may produce when used in other forms or employed in other ways.

Baguettes Encensoires (Fumigating Pencils).

Benzoin	14 oz.
Charcoal	1¾ oz.
Peru balsam	1 oz.
Storax	2 oz.
Shellac	3½ oz.
Olibanum	5½ oz.
Civet	75 grains.
Oil of bergamot	1 oz.
Oil of orange peel	1 oz.
Oil of santal	¾ oz.

Melt the benzoin, charcoal, shellac, and olibanum in a bright iron pan at the

lowest possible heat; take the pan from the fire and add the other ingredients, heat being again applied from time to time to keep the mass in a liquid state. The plastic mass is rolled out on a marble slab into rods the thickness of a lead pencil. Such a pencil need be but lightly passed over a hot surface to volatilize the aromatics it contains.

Pastilles Odoriférantes.

Charcoal	2 lb.
Saltpetre	3½ oz.
Benzoin	1½ lb.
Cloves	7 oz.
Tolu balsam	7 oz.
Vanilla	7 oz.
Vetiver root	7 oz.
Cinnamon	3½ oz.
Oil of neroli	150 grains.
Oil of santal	¾ oz.

This and the following formula give the finest mixtures for pastils.

Pastilles Enbaumées.

Charcoal	2 lb.
Saltpetre	2¾ oz.
Benzoic acid, sublimed	1 lb.
Musk	15 grains.
Civet	15 grains.
Oil of lemon grass	30 grains.
Oil of lavender	15 grains.
Oil of clove	15 grains.
Oil of thyme	30 grains.
Oil of cinnamon	30 grains.

Poudre d’Encens (Incense Powder).

Benzoin	½ lb.

Cascarilla	½ lb.
Musk	15 grains.
Santal wood	1 lb.
Saltpetre	3½ oz.
Vetiver root	5½ oz.
Olibanum	1 lb.
Cinnamon	5½ oz.

Dissolve the saltpetre in water, saturate the powders with the solution, dry the mass, and again reduce it to powder. This powder, strewn on a warm surface such as the top of a stove, takes fire spontaneously and gradually disappears.

Fumigating Papers and Wicks (Bruges Ribbons).

***French*—Papier à fumigations. Ruban de Bruges; *German*—Räucherpapiere. Räucherbänder.**

Fumigating papers are strips impregnated with substances which become fragrant on being heated; such a strip need merely be placed on a stove or held over a flame in order to perfume a whole room. Fumigating papers are divided into two groups: those meant to be burned, and those meant to be used repeatedly. The former, before being treated with aromatics, are dipped into saltpetre solution; the latter, in order to render them incombustible, are first dipped into a hot alum solution so that they are only charred by a strong heat, but not entirely consumed.

A. Inflammable Fumigating Paper.

Papier Fumigatoire Inflammable.

The paper is dipped into a solution of 3½ to 5½ ounces of saltpetre in water; after drying it is immersed in a strong tincture of benzoin or olibanum and again dried. An excellent paper is made according to the following formula:

Benzoin	5½ oz.
Santal wood	3½ oz.
Olibanum	3½ oz.
Oil of lemon grass	150 grains.
Essence of vetiver	1¾ oz.
Alcohol.	1 qt.

For use, the paper is touched with a red-hot substance, not a flame. It begins to glow at once without bursting into flame, giving off numerous sparks and a pleasant odor.

B. Non-inflammable Fumigating Paper.

Papier Fumigatoire Permanent.

This paper is prepared by dipping it in a hot solution of 3½ oz. of alum in one quart of water; after drying, it is saturated with the following mixture:

Benzoin	7 oz.
Tolu balsam	7 oz.
Tincture of tonka	7 oz.
Essence of vetiver	7 oz.
Alcohol	20 fl. oz.

This paper, when heated, diffuses a very pleasant odor and can be used repeatedly. It does not burn, and strong heat only chars it. Some manufacturers make inferior fumigating papers by dipping the alum paper simply in melted benzoin or olibanum.

C. Fumigating Ribbons

are nothing but fine flat lamp wicks treated first with saltpetre solution and then with the preceding mixture. The wick is rolled up and placed in a vessel provided with a lamp burner. It is inserted in the burner like any other wick and when lighted burns down to the metal and goes out unless screwed up higher. Fumigating vessels provided with these wicks are very practical because, if artistic in form, they form quite an ornament to the room and can be instantly set in operation. A French formula gives the following mixture for saturating the wicks:

Benzoin	1 lb.
Musk	¾ oz.
Myrrh	3½ oz.
Tolu balsam	3½ oz.
Tincture of orris root	1 pint.
Oil of rose	15 grains.

Fumigating Waters and Vinegars (Eaux Encensoires, Vinaigres Encensoires).

These fluids are nothing but strong solutions of various aromatics in alcohol, a few drops of which suffice, if evaporated on a warm plate, to perfume a large room. The following is a good formula for fumigating water.

Benzoin	7 oz.
Cascarilla	3½ oz.
Cardamoms	3½ oz.
Mace	1¾ oz.
Musk	150 grains.
Peru balsam	1¾ oz.
Storax	1¾ oz.
Tolu balsam	1¾ oz.
Olibanum	3½ oz.
Orris root	14 oz.
Civet	150 grains.
Cinnamon	7 oz.
Oil of bergamot	1½ oz.
Oil of lemon	1½ oz.
Oil of geranium	¾ oz.
Oil of lavender	¾ oz.
Oil of neroli	150 grains.
Alcohol	2 qts.

Of course, this liquid must be filtered after prolonged maceration. By adding to it 1½ oz. of glacial acetic acid we obtain the so-called fumigating vinegar which is very useful for expelling bad odors.

Fumigating Powders (Poudres Encensoires).

These powders which need only to be heated in order to diffuse one of the most pleasant odors, are easily prepared by intimately mixing the ground solids with the oils by means of a spatula. We add three renowned formulas for the manufacture of such powders.

A. Poudre Impériale.

Benzoin	3½ oz.
Cascarilla	1¾ oz.
Lavender	1¾ oz.
Rose leaves	1¾ oz.
Santal wood	1¾ oz.
Olibanum	3½ oz.
Orris root	3½ oz.
Cinnamon	1¾ oz.
Oil of lemon	75 grains.
Oil of clove	30 grains.
Oil of patchouly	15 grains.

B. Poudre de la Reine.

Benzoin	7 oz.
Cedar wood	1 lb.
Cinnamon	14 oz.
Lavender	10½ oz.
Rose leaves	10½ oz.
Patchouly herb	3½ oz.
Vetiver root	3½ oz.
Civet	150 grains.
Oil of bergamot	¾ oz.
Oil of lemon	¾ oz.
Oil of neroli	150 grains.
Oil of clove	150 grains.

C. Poudre Royale.

Cinnamon	½ lb.
Cloves	½ lb.
Orris root	12½ oz.
Storax	12½ oz.

Lavender	1 lb.
Oil of clove	⅜ oz.
Oil of lavender	⅜ oz.
Oil of bergamot	⅜ oz.
Oil of lemon	⅜ oz.

APPENDIX.

Some Specialties.

Besides the preparations enumerated in the preceding pages, we find in perfumery some products which are in favor on account of their fragrance and are suitable for scenting ladies’ writing-desks, sewing-baskets, boxes, and similar objects. They find their most appropriate use in places where an aromatic odor is desired, while there is no room for keeping the substances themselves. These must therefore be put into a small compass, and the aromatics chosen should be distinguished by great intensity and permanence of odor.

We subjoin a few formulas for the manufacture of such specialties, and add the remark that besides the aromatics there given other substances may be used in their preparation; but that the presence of benzoin, musk, or civet, even in small amount, is always necessary, since these substances, as above stated, not only possess an intense and permanent odor, but have the valuable property of imparting lasting qualities to more volatile odors.

It is a good plan, too, to keep on hand two kinds of these specialties—one containing musk, the other none—for the reason that the musk odor is as disagreeable to some persons as it is pleasant to others.

Spanish Skin (Peau d’Espagne, Spanisch Leder).

The article sold under this name resembles in some respects sachets or scent bags and is made as follows.

Take a piece of wash-leather (chamois), trim it to a square shape, and leave it for three or four days in the following mixture:

Benzoin	½ lb.
Oil of bergamot	¾ oz.

Oil of lemon	¾ oz.
Oil of lemon grass	¾ oz.
Oil of lavender	¾ oz.
Oil of nutmeg	150 grains.
Oil of clove	150 grains.
Oil of neroli	1½ oz.
Oil of rose	1½ oz.
Oil of santal	1½ oz.
Tincture of tonka	¾ oz.
Oil of cinnamon	150 grains.
Alcohol	1 qt.

At the end of the time named remove the leather from the liquid, let it drain, spread it on a glass plate, and when dry coat it on the rough side, by means of a brush, with a paste prepared in a mortar from the following ingredients:

Benzoic acid, sublimed	150 grains.
Musk	15 grains.
Civet	15 grains.
Gum acacia	1 oz.
Glycerin	¾ oz.
Water	1¾ oz.

The leather is then folded in the centre, smoothed with a paper-knife, put under a weight, and allowed to dry. The dried leather forms the so-called perfume skin which retains its fine odor for years. Instead of the above alcoholic liquids any desired alcoholic perfume may be used; especially suitable are those containing oils of lemon grass, lavender, and rose, since they are not very volatile, and when combined with musk and civet remain fragrant for a long time. A sufficiently large piece of perfume skin inserted in a desk pad or placed among the paper will make the latter very fragrant. Spanish skin is chiefly used for this purpose, as well as for work, glove, and handkerchief boxes, etc. It is generally inclosed in a heavy silk cover.

If leather be thought too expensive, four to six layers of blotting-paper may be perfumed in the same way and properly inclosed. Thin layers of cotton wadding between paper can also be thus perfumed and used for filling pin cushions, etc.

Spanish Paste.

Mix the following substances intimately in a porcelain mortar, and add water drop by drop until a doughy mass results.

Ambergris	¾ oz.
Benzoin	1½ oz.
Musk	¾ oz.
Vanilla	¾ oz.
Orris root	¾ oz.
Cinnamon	¾ oz.
Oil of bergamot	1½ oz.
Oil of rose	¾ oz.
Gum acacia	1½ oz.
Glycerin	1½ oz.

This paste, divided into pieces about the size of a hazelnut, is used for filling the so-called cassolettes or scent boxes which are carried in the pocket, etc., like smelling bottles. Owing to its pasty consistence this preparation can be used for perfuming jewelry (small quantities are inserted within the diamond settings), fine leather goods, belts, and other articles. It is unnecessary to lengthen the list; every practical perfumer will know what objects need perfuming.

CHAPTER XIX.
HYGIENIC AND COSMETIC PERFUMERY.

Perfumery is not merely called upon to act in an æsthetic direction and gladden the senses; it has another and more important aim, that is, to aid in some respects the practice of medicine. It is not necessary to point out that in this sense, too, it acts in an æsthetic way; for health and beauty are one and inseparable.

The field relegated to perfumery with reference to hygiene is extensive, comprising the care of the skin, the hair, and the mouth. But we also find in commercial perfumery articles which possess no medicinal effect and serve merely for beautifying some parts of the body, for instance, paints and hair dyes. As it is not possible to separate perfumes with hygienic effects from cosmetics, we shall describe the latter in connection with the former.

To repeat, hygienic perfumery has to deal with such substances as have really a favorable effect on health. No one will deny that soap takes the first place among them. Soap promotes cleanliness, and cleanliness in itself is essential to health. But it would exceed the scope of this work were we to treat in detail of the manufacture of soap and its employment in the toilet; we must confine ourselves to some specialties exclusively made by perfumers and into the composition of which soap enters. We do so the more readily since perfumers are but rarely in a position to make soap, and in most cases find it more advantageous to buy the raw material, that is, ordinary good soap, from the manufacturer and to perfume it.

Next to soap in hygienic perfumery stand the so-called emulsions and creams (crêmes) which are excellent preparations for the skin and pertain to the domain of the perfumer.

The human skin consists of three distinct parts: the deepest layer, the subcutaneous cellular tissue which gradually changes into true skin; the corium or true skin (the thickest layer); and the superficial scarf skin or epidermis which is very thin and consists largely of dead and dying cells; these are continually shed and steadily reproduced from the corium.

The skin contains various depressions, namely, the sudoriparous glands which

excrete sweat; the sebaceous glands which serve the purpose of covering the skin with fat and thereby keep it soft, glossy, and supple; and lastly the hair follicles which contain the hairs, an appendage to the skin.

The main object of hygienic perfumery with reference to the skin is to keep these glandular organs in health and activity; it effects this by various remedies which, besides promoting the general health, improve the appearance of the skin.

As a special group of preparations is intended exclusively for the care of the skin, so another class is devoted to the preservation of the hair, and still another to the care of the mouth and its greatest ornament, the teeth. Accordingly the preparations belonging under this head will be divided into three groups—those for the skin, the hair, and the mouth.

CHAPTER XX.
PREPARATIONS FOR THE CARE OF THE SKIN.

Glycerin.

Pure glycerin is a substance that has a powerful beautifying effect on the skin, by rendering it white, supple, soft, and glossy; no other remedy will clear a sun-burnt skin in so short a time as glycerin. An excellent wash may be made by the perfumer by mixing equal parts of thick, colorless glycerin and orange-flower water (or some other aromatic water with fine odor), possibly giving it a rose color by the addition of a very small amount of fuchsine. Concentrated glycerin must not be used as a wash, because it abstracts water from the skin and thereby produces a sensation of heat or burning.

Besides common soap, the so-called emulsions, meals, pastes, vegetable milks and creams are the best preparations for the care of the skin; in perfumery they are even preferable to soap in some respects because they contain not only substances which have a cleansing effect like any soap, scented or not, but at the same time render the skin clearer, more transparent, and more supple.

Emulsions.

Many perfumers make a definite distinction between two groups of emulsions which they call respectively “emulsions” and “true emulsions.” By “emulsions” they mean masses which have the property of changing on contact with water into a milky fluid or becoming emulsified; the term “true emulsions” is applied to such preparations as already contain a sufficient amount of water and therefore have a milky appearance. Hence the difference between the two preparations lies in the lesser or greater quantity of water, and is so variable that we prefer to describe them under one head.

The cause of the milky appearance of the emulsions on coming in contact with water is that they contain, besides fat, substances which possess the property of keeping the fat suspended in form of exceedingly minute droplets which make the entire fluid look like milk. As a glance through the microscope shows, the milk of animals consists of a clear fluid in which the divided fat droplets (butter) float; these by their refractive power make the milk appear white.

While soaps always contain a certain quantity of free alkali, a substance having active caustic properties, emulsions include very little if any alkali, and, since they possess the same cleansing power as soap without its disadvantages with reference to the skin, their steady use produces a warm youthful complexion, as well as smoothness and delicacy of the skin.

Glycerin is of special importance in the composition of emulsions. Besides the above-mentioned property of this substance of keeping the skin soft and supple, it acts as a true cosmetic by its solvent power of coloring matters: a skin deeply browned by exposure to the sun is most rapidly whitened by the use of glycerin alone. Moreover, glycerin prevents the decomposition of the preparations and keeps them unchanged for a long time. This quality has a value which should not be underestimated; for all emulsions are very apt to decompose and become rancid owing to the finely divided fat they contain. Under ordinary conditions, only complete protection against light and air can retard rancidity, which is accompanied by a disagreeable odor not to be masked by any perfume; an addition of glycerin, which we incorporate in all emulsions, makes them more permanent owing to the antiseptic property of this substance.

Recent years, however, have made us acquainted with a substance which in very minute quantities—one-half of one per cent of the mass to be preserved by it—prevents decomposition and rancidity of fats. This is salicylic acid, a chemical product which, being harmless, tasteless, and odorless, should be employed wherever we wish to guard against destructive influences exerted by air, fermentation, etc. While formerly all emulsions were made only in small amounts, just sufficient for several weeks' use, salicylic acid enables us to manufacture larger quantities at once and to keep them without much fear of their spoiling. However, even the presence of salicylic acid is no guaranty against deterioration, if other precautions are neglected. The products should be kept in well-stoppered bottles or vessels, in a cool and dark place. All substances cannot be preserved by salicylic acid, and there are certain ferments or fungi which resist the action of salicylic acid. If chloroform is not objectionable in any of these preparations—and only so much is necessary as can be held in actual *solution* by the liquid, on an average three drops to the ounce—this preservative is preferable to salicylic acid.

The only fats used in the preparation of emulsions are expressed oil of almonds, olive oil, and lard. Almond oil is best made by immediate pressure of the bruised fruits, since fresh almond meal likewise finds application in perfumery; olive oil and lard must be very carefully purified. This is done by

heating them for one hour with about ten times the quantity of water containing soap (one per cent of the quantity of fat to be purified). They are then treated five or six times with pure warm water until the latter escapes quite neutral. If the water turns red litmus paper blue, it would indicate the presence of free alkali (soap); if it turns blue litmus paper red, it would prove the presence of free fatty acids (rancid fat). Either one of these substances, especially the latter, would injure the quality of the product. The fat should be absolutely neutral and have no influence on either kind of litmus paper; then its quality may be pronounced perfect.

CHAPTER XXI.
FORMULAS FOR THE PREPARATION OF EMULSIONS, MEALS, PASTES, VEGETABLE MILK, AND COLD-CREAMS.

A. Emulsions.

Amandine.

Almond Cream.—Melt ten pounds of purified lard in an enamelled iron pot or a porcelain vessel, and while increasing the temperature add little by little five pounds of potash lye of 25% strength, stirring all the time with a broad spatula. When fat and lye have become a uniform mass, 2¾ to 3½ ounces of alcohol is gradually added, whereby the mixture acquires a translucent, crystalline appearance. Before the alcohol is added three-fourths to one ounce of oil of bitter almond is dissolved in it. The soapy mass thus obtained is called "almond cream" (crême d'amandes) and may be used alone for washing. For making Amandine take of—

Expressed oil of almonds	10 lb.
Almond cream	3½ oz.
Oil of bergamot	1 oz.
Oil of bitter almond	1½ oz.
Oil of lemon	150 grains.
Oil of clove	150 grains.
Oil of mace	150 grains.
Water	1¾ oz.
Sugar	3½ oz.

In the manufacture the following rules should be observed.

Effect the mixture in a cool room, the cellar in summer, a fireless room in winter. Mix the ingredients in a shallow, smooth vessel, best a large porcelain dish, using a very broad, flat stirrer with several holes. The sugar is first dissolved in the water and intimately mixed with the almond cream. The essential oils are dissolved in the almond oil contained in a vessel provided with a stop-cock. The oil is first allowed to run into the dish in a moderate stream

under continual stirring. The mass soon grows more viscid, and toward the end of the operation the flow of oil must be carefully restricted so that the quantity admitted can be at once completely mixed with the contents of the dish. Well-made amandine must be rather consistent and white, and should not be translucent. If translucency or an oily appearance is observed during the mixture, the flow of oil must be at once checked or enough almond cream must be added to restore the white appearance, under active stirring.

As amandine is very liable to decompose, it must be immediately filled into the vessels in which it is to be kept, and the latter, closed air-tight, should be preserved in a cool place. By adding ¾ ounce of salicylic acid, amandine may be made quite permanent so that it can be kept unchanged even in a warm place.

We have described the preparation of amandine at greater length because its manufacture requires some technical skill and because the preparation of all other cold-creams corresponds in general with that of amandine.

Glycerin Emulsions. A. Glycerin Cream.

Glycerin	½ lb.
Almond oil	14 oz.
Rose water	12½ oz.
Spermaceti	3½ oz.
Wax	480 grains.
Oil of rose	60 grains.

Melt the wax and spermaceti by gentle heat, then add the almond oil, next the glycerin mixed with the rose water, and lastly the oil of rose which may also be replaced by some other fragrant oil or mixture. If the preparation is to be used in summer, it is advisable to increase the wax by one-half, thus giving the mass greater consistence.

B. Glycerin Jelly.

Glycerin	2 lb.
Almond oil	6 lb.
Soap	5½ oz.
Oil of orange peel	150 grains.
Oil of thyme	¾ oz.

Mix the soap with the glycerin, gradually add the oil (as for amandine), and finally the aromatics.

Jasmine Emulsion.

Huile antique de jasmin	2 lb.
Almond cream	5½ oz.
Expressed oil of almond	4 lb.
Water	5½ oz.
Sugar	2¾ oz.

Mix in the same order as given under Amandine.

Tuberose Emulsion.

Huile antique des tubéroses	1¾ to 2 lb.
Almond cream	5½ oz.
Expressed oil of almond	4 lb.
Water	5½ oz.
Sugar	2¾ oz.

Violet Emulsion.

Huile antique des violettes	2 to 3 lb.
Almond cream	5½ oz.
Expressed oil of almond	4 lb.
Water	5½ oz.
Sugar	2¾ oz.

In place of the huiles antiques named (*i.e.*, fine oils saturated with the odors of the corresponding flowers) any other huile antique may be used and the cream then called by the name of the flower whose odor it possesses. Such creams with genuine huiles antiques are among the finest preparations known in perfumery and of course are high-priced, owing to the cost of the huiles antiques.

Olivine.

Gum acacia	½ lb.

Yolk of egg	10 yolks.
Olive oil	4 lb.
Soap	7 oz.
Water	8 oz.
Sugar	5½ oz.
Oil of bergamot	2 oz.
Oil of lemon	2 oz.
Oil of clove	1 oz.
Oil of orange peel	¾ oz.
Oil of thyme	75 grains.
Oil of cinnamon	75 grains.

The gum, sugar, water, and yolk of eggs are first intimately mixed and gradually added to the olive oil containing the essential oils.

B. Meals and Pastes.

The so-called meals (farines) and pastes (pâtes) really consist of the flour of fatty vegetable substances which possess the property of forming an emulsion with water and are frequently used in washes. As they are free from alkali, they are the most delicate preparations of the kind and are especially suitable for washing the face or sensitive hands.

Simple Almond Paste (Pâte d'Amandes Simple).

Bitter almonds	6 lb.
Alcohol	2 qts.
Rose water	4 qts.
Oil of bergamot	10½ oz.
Oil of lemon	3½ oz.

Put the bitter almonds in a sieve, dip them for a few seconds in boiling water, when they can be easily deprived of their brown skin; carefully bruise them in a mortar, and place them in a glazed pot set in another kept full with boiling water; pour over them two quarts of the rose water heated to near the boiling-point. Keep up the heat under continual stirring until the almond meal and rose water form a uniform mass free from granules; in other words, until the meal is

changed into paste. The pot is now allowed to cool somewhat, when the rest of the rose water and the oils dissolved in alcohol are added. Almond paste should have a uniform, butter-like consistence if the first part of the operation has been carefully performed.

Almond and Honey Paste (Pâte d'Amandes au Miel).

Bitter almonds	2 lb.
Yolk of egg	30 yolks.
Honey	4 lb.
Expressed oil of almond	4 lb.
Oil of bergamot	1 oz.
Oil of lemon	¾ oz.
Oil of clove	¾ oz.

Decorticate and bruise the bitter almonds and add them with the essential oils to the mixed yolks, honey, and almond oil.

Almond Meal (Farine d'Amandes).

Almond meal	4 lb.
Orris root, powdered	5½ oz.
Oil of lemon	1 oz.
Oil of bitter almond	150 grains.
Oil of lemon grass	75 grains.

Almond meal here means the bran left after expressing the oil from sweet almonds. First mix the powdered orris root intimately with the essential oils and triturate the mass with the almond bran. Other essential oils may also be used for perfuming the mass.

Pistachio Meal (Farine de Pistaches).

Pistachio nuts	4 lb.
Orris root, powdered	4 lb.
Oil of lemon	1¾ oz.
Oil of neroli	150 grains.
Oil of orange peel	1 oz.

The pistachio nuts are blanched in the same manner as almonds (see under Simple Almond Paste), and then reduced to a meal.

C. Vegetable Milk.

The several varieties of vegetable milk are merely emulsions containing sufficient water to give them a milky appearance. They are used as such for washes and are in great favor. Owing to the larger amount of water they contain, they are more liable to decompose than the preparations described above, since the fats present in them easily become rancid on account of their fine division in the milk.

In order to render these preparations more stable, they receive an addition of about five to ten per cent of their weight of pure glycerin which enhances their cosmetic effect. The addition of about one-half of one per cent of salicylic acid is likewise to be recommended, as it makes them more stable.

In the following pages we shall describe only the most important of these preparations usually made by the perfumer. In this connection we may state that by slightly modifying the substances used to perfume them, new varieties of

vegetable milk can be easily prepared.

Every vegetable milk consists in the main of a base of soap, wax, and spermaceti, and an aromatic water which gives the name to the preparation. This composition is intended to keep suspended the fatty vegetable substances (almond or pistachio meal, etc.), thus producing a milky appearance.

Vegetable milks are made as follows.

Melt the soap with the wax and spermaceti at a gentle heat. Prepare a milk from the vegetable substance and the aromatic water (*e.g.*, *unexpressed* almonds and rose water) by careful trituration, strain it through fine silk gauze into the vessel containing the melted mixture of soap, wax, and spermaceti, stir thoroughly, let it cool, and add the alcohol holding in solution the essential oils, the glycerin (and the salicylic acid), under continual stirring. The alcohol must be added in a very thin stream, otherwise a portion of the mass will curdle. The coarser particles contained in the milk must be allowed to settle by leaving the preparation at rest for twenty-four hours, when the milk can be carefully decanted from the sediment and filled into bottles for sale.

Lilac Milk (Lait de Lilas).

Soap	2¼ oz.
Wax	2¼ oz.
Spermaceti	2¼ oz.
Sweet almonds	1 lb.
Lilac-flower water	4½ pints.
Huile antique de lilas	2½ oz.
Alcohol (80-85% Tralles)	2 lb.

In place of lilac-flower water and huile antique de lilas, lilacin (terpineol) may be used, a sufficient quantity (about 1 oz.) being dissolved in the alcohol. But the lilacin must be pure and of clean odor.

Virginal Milk (Lait Virginal).

This preparation differs from all other milks sold in perfumery in that it consists of some aromatic water with tincture of benzoin and tolu. In making it, pour the aromatic water in a very thin stream into the tincture under vigorous stirring. If the water flows in too rapidly, the resins present in the tincture

separate in lumps; but if slowly poured in, the resins form minute spheres which remain suspended. The preparation is named after the aromatic water it contains: Lait virginal de la rose, à fleurs d'oranges, etc. Its formula is:

Tincture of benzoin	2 oz.
Tincture of tolu	2¾ oz.
Aromatic water	4 qts.

CUCUMBER MILK (LAIT DE CONCOMBRES).

Soap	1 oz.
Olive oil	1 oz.
Wax	1 oz.
Spermaceti	1 oz.
Sweet almonds	1 lb.
Cucumber juice (freshly expressed)	4½ pints.
Extract of cucumber	1 pint.
Alcohol	2 lb.

DANDELION MILK.

Soap	2¼ oz.
Olive oil	2¼ oz.
Wax	2¼ oz.
Sweet almonds	1 lb.
Extract of tuberose	1 lb.
Rose water	5 pints.
Dandelion juice	5 oz.

Dandelion juice is the bitter milk sap of the root of the common dandelion (Leontodon taraxacum); it should be expressed immediately before use. The rose water may be replaced by some other aromatic water or even ordinary water; but the latter should be distilled, otherwise the lime it contains would form an insoluble combination with the soap.

BITTER-ALMOND MILK (LAIT D'AMANDES AMÈRES).

Bitter almonds	2¼ oz.
Soap	2¼ oz.
Expressed oil of almond	2¼ oz.
Wax	2¼ oz.
Spermaceti	2¼ oz.
Rose water	4 qts.
Alcohol	3 pints.
Oil of bitter almond	½ oz.
Oil of bergamot	1 oz.
Oil of lemon	½ oz.

Rose Milk (Lait de Roses).

Olive oil	2¼ oz.
Soap	2¼ oz.
Wax	2¼ oz.
Spermaceti	2¼ oz.
Sweet almonds	4 lb.
Oil of rose	150 grains.
Rose water	4 qts.
Alcohol	1 pint.

Pistachio Milk (Lait de Pistaches).

Soap.	2¼ oz.
Olive oil	2¼ oz.
Wax	2¼ oz.
Spermaceti	2¼ oz.
Pistachio nuts	14 oz.
Oil of neroli	¾ oz.
Orange-flower water	6 qts.
Alcohol	1 qt.

D. Cold-Creams and Lip Salves.

In the main they resemble in their composition the emulsions and vegetable milks, but differ by their thick consistence which renders them suitable for being rubbed into the skin. Cold-creams are really salves perfumed with one of the well-known odors which give them their names. Fat forms the basis of these mixtures and gives them their hygienic effect, as it imparts fulness and softness to the skin. Every well-made cold-cream should have the consistence of recently congealed wax and should yield to the pressure of the finger like pomatum. It should be noted that the addition of very thick glycerin will increase the effect of the cold-cream and improve its fine transparent appearance; but this substance must be added with great care, otherwise the mass will not possess the required firmness.

In making cold-cream, a mixture of wax, spermaceti, and expressed almond oil must be combined with an aromatic water and an essential oil. The first part of the operation is easy; the wax and spermaceti are melted at the lowest possible temperature, and the almond oil is added under continual stirring. It is more difficult to unite the other substances with this base; the aromatic water is admitted in a thin stream under vigorous stirring (or whipping, or churning), and when it forms a uniform mass with the contents of the mortar the remaining substances are stirred in and the still fluid mass is poured into the vessels intended for it, and allowed to congeal.

Cold-creams are usually sold in tasteful porcelain jars or vases. To guard against rancidity of the mass, the vessels are closed either with ground stoppers or with corks covered with tin foil. The essential oils should be added last, when the mass has cooled to the congealing-point; if added before, too much of them is lost by evaporation.

We give below several approved formulas for the preparation of some favorite cold-creams, and repeat that new varieties can be produced by introducing any desired odor into the composition.

Glycerin Cold-Cream A.

Expressed oil of almond	2 lb.
Wax	2½ oz.
Spermaceti	2½ oz.
Glycerin	7 oz.
Oil of bergamot	¾ oz.

Oil of lemon	¾ oz.
Oil of geranium	¾ oz.
Oil of neroli	150 grains.
Oil of cinnamon	150 grains.
Rose water	1 lb.

Glycerin Cold-Cream B.

Expressed oil of almond	2 lb.
Wax	4½ oz.
Spermaceti	4½ oz.
Glycerin	½ lb.
Oil of rose	150 grains.
Civet	30 grains.

Camphor Ice (Camphor Cold-Cream).

Wax	2¼ oz.
Spermaceti	2¼ oz.
Expressed oil of almond	2 lb.
Camphor	4½ oz.
Oil of rosemary	90 grains.
Oil of peppermint	45 grains.
Rose water	2 lb.

Camphor Ice (Pâte Camphorique).

Lard	2 lb.
Wax	½ lb.
Camphor	½ lb.
Oil of lavender	½ oz.
Oil of rosemary	½ oz.

This mixture, which is rather firm, is frequently poured into shallow porcelain boxes; sometimes it is colored red with alkanet root.

Camphor Balls (Savonettes Camphoriques).

Expressed oil of almond	7 oz.
Purified tallow	2 lb.
Wax	7 oz.
Spermaceti	7 oz.
Camphor	7 oz.
Oil of lavender	¾ oz.
Oil of rosemary	¾ oz.
Oil of cinnamon	75 grains.

Savonette is generally understood to mean a soap cast in spherical moulds; this preparation is, as a rule, likewise sold in this form.

Divine Pomade A.

Expressed oil of almond	3 lb.
Spermaceti	1 lb.
Lard	2 lb.
Benzoin	1 lb.
Vanilla	7 oz.
Civet	¾ oz.

The aromatic substances, having been comminuted, are thoroughly triturated with the other ingredients, and the mass is kept for twenty-four hours at a temperature of 50 to 60° C. (112-140° F.), when it is carefully decanted from the sediment, which is treated again with another mass of the same substances for thirty-six to forty-eight hours.

Divine Pomade B.

Beef marrow	2 lb.
Benzoin	1½ oz.
Nutmegs	1 oz.
Cloves	1 oz.
Storax	1½ oz.
Orris root	1½ oz.
Civet	75 grains.

Cinnamon	1 oz.
Orange-flower water	2 lb.

The solid substances are macerated for forty-eight hours with the warm marrow, the liquid perfumed marrow is then strained off and mixed with the orange-flower water.

Cologne Cold-Cream (Crême de Cologne).

Expressed oil of almond	2 lb.
Wax	2½ oz.
Spermaceti	2½ oz.
Mecca balsam	7 oz.
Tolu balsam	3½ oz.
Rose water	14 oz.

Mecca balsam has been a rare article in commerce for many years. That which is usually sold as such is more or less adulterated or an imitation. The genuine was derived from Balsamodendron Opobalsamum Kunth.

Cucumber Cold-Cream A.

Expressed oil of almond	2 lb.
Wax	2¼ oz.
Spermaceti	2¼ oz.
Extract of cucumber	5½ oz.
Cucumber juice, fresh	2 lb.

The cucumber juice is carefully heated to 60 or 65° C. (140-149°F.), rapidly filtered from the curds, and at once added to the rest of the mass.

Cucumber Cold-Cream B.

Lard	6 lb.
Spermaceti	2 lb.
Benzoin	7 oz.
Extract of cucumber	2 lb.

The benzoin is first macerated with the warmed fat for twenty-four hours, and this aromatic fat is treated in the usual manner.

Lip Salve A (Pomade Blanche pour les Lèvres).

Expressed oil of almond	2 lb.
Wax	4½ oz.
Spermaceti	4½ oz.
Oil of bitter almond	½ oz.
Oil of lemon grass	75 grains.
Oil of rose	75 grains.

Red Lip Salve B (Pomade à la Rose Pour les Lèvres).

Expressed oil of almond	2 lb.
Wax	4½ oz.
Spermaceti	4½ oz.
Oil of geranium	150 grains.
Oil of santal	90 grains.
Alkanet root	4½ oz.

The beautiful red color which distinguishes this preparation is produced with alkanet root; the mass, before the essential oils are added, being macerated for from six to eight hours, under frequent stirring, with the comminuted root, and then decanted from the sediment.

Cherry Salve C (Pomade Cerise).

Expressed oil of almond	2 lb.
Wax	4½ oz.
Spermaceti	4½ oz.
Oil of bitter almond	½ oz.
Oil of sweet bay	150 grains.
Alkanet root	4½ oz.

The procedure is the same as for pomade à la rose.

Almond Cold-Cream.

Expressed oil of almond	2 lb.
Wax	4½ oz.
Spermaceti	4½ oz.
Rose water	2 lb.
Oil of bitter almond	¾ oz.
Civet	30 grains.

Almond Balls (Savonettes d'Amandes).

Tallow	2 lb.
Wax	10½ oz.
Spermaceti	7 oz.
Oil of bitter almond	150 grains.
Oil of clove	75 grains.
Oil of cinnamon	75 grains.

This is usually formed into balls.

Rosebud Cold-Cream.

Almond oil	2 lb.
Wax	2½ oz.
Spermaceti	2½ oz.
Rose water	2 lb.
Oil of rose	75 grains.
Oil of geranium	75 grains.

Violet Cold-Cream (Crême de Violettes).

Huile antique de violettes	2 lb.
Wax	2½ oz.
Spermaceti	2½ oz.
Violet water	2 lb.
Oil of bitter almond	150 grains.
Oil of neroli	75 grains.

APPENDIX.

Nail Powder (Poudre pour les Ongles; Fingernagel-Pulver).

The finger nails, being an appendage to the skin, belong under the head of the Care of the Skin; we therefore give a formula for preparing the powder used for imparting smoothness and gloss to the nails. For use, some of the powder is poured on a piece of soft glove leather and the nails are rubbed until they shine.

Oxide of tin	4 lb.
Carmine	¾ oz.
Oil of bergamot	150 grains.
Oil of lavender	150 grains.

The oxide of tin must be an impalpable powder and is mixed with the other substances in a mortar.

CHAPTER XXII.
THE PREPARATIONS USED FOR THE CARE OF THE HAIR (POMADES AND HAIR OILS).

The hair, the beautiful ornament of the human body, requires fat for its care and preservation, for there are but few persons whose scalp is so vigorous that the hair can derive sufficient nourishment from it to maintain its gloss and smoothness.

Among the ancient Greeks, Romans, and Germans various ointments were in use for the care of the hair. In Rome there was even, as we have stated in an earlier part of the book, a special guild of ointment-makers or unguentarii. They employed a process for making their ointments fragrant which resembles that of maceration in present use.

The so-called pomades (from pomum, apple) were prepared by sticking a fine apple full of spices and placing it for a long time in liquid fat which absorbed the odor of the spices.

In the present state of chemical science, the basis of every pomade or hair oil is formed by some fat perfumed with aromatic substances and at times colored. The fats generally used are lard, beef marrow, tallow, bears’ grease, olive or almond oil; some of the firmer fats receive an addition of a certain amount of paraffin, spermaceti, or wax, in order to give the pomade greater consistence. As in the manufacture of all the finer articles, it is essential that whatever fat is employed should be perfectly pure; only fat which is absolutely neutral, *i.e.*, free from acid, can be used, and any sample with but a trace of rancidity (containing free fatty acids) should be rejected on account of the penetrating odor peculiar to several of these acids.

Manufacturers who aim at the production of fine goods spare neither trouble nor expense in order to obtain perfectly pure fats.

Fats are purified for the purposes of the perfumer in the following manner:

The fat is melted in a bright iron pot or enamelled vessel with three times the quantity of water containing in solution about one per cent (of the weight of the fat) of alum and one per cent of table salt. Fat and water are well stirred with a broad flat ladle or some mechanical arrangement within the boiler. After the

mass has remained at rest for some time, the curdled solid matters are skimmed from the surface. The time required for this operation can be much shortened by the use of a pump which raises the fat and water from the boiler and returns them in a fine spray.

When fats with some degree of rancidity are to be made suitable for the purposes of the perfumer, 0.5% of caustic soda lye is added to the water instead of the alum.

After this treatment is completed, the fat must be washed in order to free it from the substances with which it was purified. Formerly this washing was done in a manner resembling the grinding of oil colors. The fat was placed on a level stone plate and kneaded with a muller with flat base under a continual stream of water flowing from above, until the fat was clean. This expensive hand labor is now performed by machines, the fat being treated with water in vertical mills.

No matter how carefully a fat was purified, it may happen that the pomades made from it, if kept long in stock, may subsequently become rancid—a circumstance which may destroy the reputation of a factory. Fortunately we know two substances which materially counteract the tendency of fats to become rancid: salicylic acid and benzoin. Either of these substances is added to many perfumery articles, especially pomades, in order to prevent rancidity; an admixture of from one-one-thousandth to five-one-thousandths parts of solid salicylic acid suffices, according to our experiments, for the purpose; of benzoin we need about three-fourths of an ounce for every quart of fat; the resin is only partly soluble in fat, but imparts to it its vanilla-like odor. For the finest pomades sublimed benzoic acid is used, in the proportion of about 150 to 240 grains to the quart of fat.

CHAPTER XXIII.
FORMULAS FOR THE MANUFACTURE OF POMADES AND HAIR OILS.

A. Pomades.

In manufacturing perfumery two groups of pomades are distinguished—those with a hard base, and those with a soft base. By base is meant the fat which is the vehicle of the odor in every pomade. The consistence of the substance depends upon its melting-point; lard and beef marrow, having a low melting-point, furnish soft pomades; while beef and mutton tallow, which often receive an addition of paraffin, wax, or spermaceti in order to make them firmer, have a higher melting-point and serve for hard pomades.

French perfumers put on the market some very fine pomades consisting of the fat which has served for the absorption of odors by maceration, enfleurage, etc., and which has been treated with alcohol for the extraction of the odors (so-called washed pomades). No matter how long such a fat is treated with alcohol, it tenaciously retains a portion of the odor to which the great fragrance of these pomades is due and which has given them their reputation.

If the pomades resulting from the following formulas should turn out too soft—a fact depending on the climate of the place of manufacture—they may receive an addition of a mixture of equal parts of paraffin, wax, and spermaceti, in portions of respectively five per cent at each addition, until the desired ointment-like consistence is attained.

Cantharidal Pomade.

Beef marrow	4 lb.
Wax	7 oz.
Oil of mace	150 grains.
Oil of clove	150 grains.
Oil of rose	150 grains.
Tincture of cantharides	¾ oz.

Tincture of cantharides is prepared by prolonged maceration of ¾ ounce of

powdered cantharides in one quart of alcohol.

Circassian Pomade.

Benzoin pomade (see below)	2 lb.
Rose pomade	1 lb.
Lard	2 lb.
Expressed oil of almond	4 lb.
Alkanet root	3½ oz.
Oil of rose	½ oz.

The almond oil alone is first macerated with the alkanet root until, when added to the other ingredients, it imparts a beautiful red color to the pomade.

Benzoin Pomade A.

Benzoic acid, sublimed	4¼ oz.
Purified fat	4 lb.

Benzoin Pomade B.

Benzoin	12¼ oz.
Fat	4 lb.

Macerate the benzoin or benzoic acid in the fat at the temperature of boiling water for several hours, and strain the pomade through a cloth.

Double Pomades.

These pomades are put on the market in excellent quality especially by French manufacturers. They consist of a mixture of washed pomades and huiles antiques. The respective quantities must be chosen according to the climate of the country for which the articles are intended. Colder countries require equal parts by weight of pomades and oils; warmer climates, two parts of fat to one of oil.

Crystallized Oil (Huile Crystallisée).

Huile antique of orange flowers	1 lb.
Huile antique of roses	2 lb.

Huile antique of tuberoses	2 lb.
Huile antique of violets	2 lb.
Spermaceti	1 lb.
Paraffin	7 oz.

The addition of spermaceti and paraffin causes the mixture to assume a crystalline form on cooling, the appearance improving in proportion as the cooling is slow and gradual. First melt the paraffin and spermaceti on a water bath, add the huiles antiques, mix thoroughly by prolonged stirring, and pour the finished product into the vessels in which it is to be sold. These vessels are previously warmed to 60 or 70° C. (140-158°F.), and very slowly after filling, so as to secure a beautiful crystalline mass. A second quality of crystalline hair oil is made according to the following formula:

Expressed oil of almond	10 lb.
Spermaceti	21 oz.
Paraffin	14 oz.
Oil of bergamot	2 oz.
Oil of lemon	4¼ oz.
Oil of bitter almond	150 grains.

Blossom Pomade (Pomade à Fleurs).

Expressed oil of almond	4 lb.
Jasmine pomade	28 oz.
Rose pomade	28 oz.
Violet pomade	28 oz.
Oil of bergamot	½ oz.
Oil of lemon	150 grains.

Bear’s Grease Pomade (Pomade à Graisse d’Ours).

Expressed oil of almond	20 lb.
Lard	24 lb.
Cassie pomade	4 lb.
Jasmine pomade	4 lb.
Huile antique of cassie	1 lb.

Huile antique of jasmine	1 lb.
Huile antique of orange flowers	1 lb.
Huile antique of roses	1 lb.
Huile antique of tuberoses	1 lb.
Oil of bergamot	½ lb.
Oil of lemon	3½ oz.
Oil of nutmeg	1½ oz.
Oil of clove	4¼ oz.

This pomade is rather consistent; if it is to be made still firmer for summer use or warm climates, the almond oil should be diminished and the lard increased in proportion, or some tallow and wax added. The pomade is made by mixing the oil and lard, adding next the pomades and huiles antiques, and finally the essential oils. The temperature should not be higher than suffices to keep the mass liquid; the mixture is effected by vigorous stirring, and is then at once, though gradually, cooled.

Beef-Marrow Pomade (Pomade à Moëlle de Bœuf).

Lard	8 lb.
Beef marrow	4 lb.
Oil of bergamot	1 oz.
Oil of lemon	2 oz.
Oil of mace	150 grains.
Oil of clove	150 grains.

Marrow Cream (Crême de Moëlle).

Expressed oil of almond	4 lb.
Lard	4 lb.
Palm oil	3½ oz.
Oil of bergamot	2 oz.
Oil of lemon	7 oz.
Oil of nutmeg	150 grains.
Oil of clove	150 grains.
Oil of cinnamon	150 grains.

The public is accustomed to receive the last two pomades in the form of froth. This can be easily effected by whipping the pomade during cooling with an egg-beater until it is solidified.

Cinchona Pomade (Pomade à Quinquine).

Lard	4 lb.
Expressed oil of almond	1 lb.
Beef marrow	6 lb.
Peru balsam	1 oz.
Cinchona bark	¾ oz.
Oil of clove	1 oz.
Oil of rose	150 grains.

Macerate the finely powdered bark in the fat for some hours, add the Peru balsam, strain through a cloth, and incorporate the essential oils. The pomade is vaunted as a hair tonic, as well as

Tanno-Quinine Pomade,

which is prepared in the same way; the only difference being the addition of 150 grains of tannin.

Castor-Oil Cream (Crême de Ricine).

Expressed oil of almond	3 lb.
Castor oil	3 lb.
Rose pomade	2 lb.
Orange-flower pomade	2 lb.
Tuberose pomade	2 lb.
Oil of bergamot	7 oz.
Oil of lemon	3½ oz.

Orange-flower Pomade (Pomade à Fleurs d’Oranges).

Expressed oil of almond	38½ oz.
Cassie pomade	38½ oz.
Rose pomade	35 oz.

Jasmine pomade	35 oz.
Oil of bitter almond	150 grains.
Oil of neroli	½ oz.

Heliotrope Pomade (Pomade de Héliotrope).

Rose pomade	4 lb.
Orange-flower pomade	1 lb.
Huile antique of jasmine	2 lb.
Huile antique of orange flower	1 lb.
Huile antique of tuberose	1 lb.
Vanilla pomade	2 lb.
Oil of bitter almond	150 grains.
Oil of clove	75 grains.

Transparent Pomade.

Expressed oil of almond	6 lb.
Wax	5½ oz.
Spermaceti	1 lb.
Oil of bitter almond	75 grains.
Oil of rose	150 grains.
Tincture of musk	1½ oz.

The pomade is completely liquefied after being mixed and allowed to congeal in the vessels in which it is marketed. If successful, the product must be quite transparent or at least decidedly translucent.

Tonka Cream.

Tonka beans	1 lb.
Lard	8 lb.

The powdered beans are stirred into the melted fat, in which they remain for several days, the fat being agitated from time to time; when it smells strong enough, it is strained through fine linen, and the tonka beans are treated with another quantity of fat.

Violet Pomade (Pomade des Violettes).

Lard	4 lb.
Cassie pomade	3 lb.
Rose pomade	2 lb.

Violet pomade	2 lb.

VANILLA CREAM (CRÊME DE VANILLE).

Vanilla	7 oz.
Lard	6 lb.

In making this pomade the material is treated the same as in preparing tonka pomade. Ordinary vanilla pomade is made by triturating:

Peru balsam	7 oz.
Lard	2 lb.
Expressed oil of almond	2 lb.

First triturate the balsam with the almond oil and gradually add the lard. Another, much better process is the following:

VANILLA POMADE.

Vanillin	80 grains.
Peru balsam	½ oz.
Lard	6 lb.

Dissolve the vanillin and balsam of Peru in about 4 oz. of alcohol. Melt the lard at as low a temperature as possible, then add the solution, stir until it is well incorporated, and afterward repeatedly until the mass is cold.

POMADE PHILOCOME.

Huile antique of cassie	1 lb.
Huile antique of jasmine	1 lb.
Huile antique of orange flower	3½ oz.
Huile antique of rose	3½ oz.
Huile antique of tuberose	3½ oz.
Huile antique of violet	1 lb.
Paraffin	10½ oz.
Wax	14 oz.

This pomade has a delightful odor but is expensive; an inferior and much

cheaper philocome is made as follows:

Expressed oil of almond	8 lb.
Paraffin	½ lb.
Wax	14 oz.
Oil of bergamot	4¼ oz.
Oil of lemon	1¾ oz.
Oil of lavender	¾ oz.
Nutmeg	75 grains.
Cloves	75 grains.
Cinnamon	75 grains.

Pomades are usually colored—rose pomade, red; reseda pomade, green; violet pomade, violet, etc. For this purpose aniline colors are frequently used; they must be dissolved in glycerin and added to the fat, as they are insoluble in the latter. The coloring matter is added when the pomades are finished, before they are allowed to congeal.

B. Hair Oils.

These differ from pomades mainly by containing huiles antiques instead of washed pomades; they are therefore more or less liquid and are used for the hair as much as pomades.

Benzoated Oil (Huile à Benjamin).

Sublimed benzoic acid	5 oz.
Expressed oil of almond	4 lb.

The acid must be dissolved in the hot oil.

Huile à l'Ess-Bouquet.

Oil of rose	150 grains.
Oil of reseda	3½ oz.
Oil of violet	150 grains.
Tincture of musk	75 grains.
Almond oil	6 lb.

The essential oils are mixed, and the almond oil is added in small portions under continual stirring.

Heliotrope Hair Oil (Huile Héliotrope).

Huile antique of jasmine	10½ oz.
Huile antique of rose	2 lb.
Huile antique of orange flower	5½ oz.
Huile antique of tuberose	5½ oz.
Huile antique of vanilla	1 lb.
Oil of bitter almond	150 grains.
Oil of clove	75 grains.

Jasmine Hair Oil (Huile de Jasmin).

Expressed oil of almond	4 lb.
Huile antique of jasmine.	7 oz.
Oil of bergamot	1 oz.
Oil of lemon	150 grains.

Oil of Swiss Herbs.

Expressed oil of almond	4 lb.
Oil of bergamot	150 grains.
Oil of lemon	75 grains.
Oil of lavender	75 grains.
Oil of peppermint	150 grains.
Oil of cinnamon	75 grains.

Oil of Burdock Root.

Expressed oil of almond	4 lb.
Burdock root	1 lb.
Oil of bergamot	1 oz.
Oil of lemon	1 oz.
Oil of rose	¾ oz.

The burdock root is macerated for two days in the warm oil, which is then filtered and the other ingredients are added.

Macassar Oil.

Expressed oil of almond	4 lb.
Alkanet root	7 oz.
Oil of clove	75 grains.
Oil of mace	75 grains.
Oil of rose	75 grains.
Oil of cinnamon	½ oz.
Tincture of musk	75 grains.

The alkanet root in coarse powder must be macerated in the warm almond oil until it acquires a deep red color.

Peru Hair Oil.

Peru balsam	3½ oz.
Storax	1¾ oz.
Expressed oil of almond	8 lb.

Mix by stirring, and allow to settle for two weeks in a completely filled bottle.

Huile Philocome.

Expressed oil of almond	4 lb.
Huile antique of cassie	1 lb.
Huile antique of jasmine	28 oz.
Wax	3½ oz.
Spermaceti	1¾ oz.
Oil of neroli	1 oz.
Oil of rose	150 grains.
Oil of cinnamon	75 grains.

Portugal Oil.

Expressed oil of almond	4 lb.

Oil of bergamot	1 oz.
Oil of lemon	150 grains.
Oil of neroli	75 grains.
Oil of orange flower	75 grains.
Oil of orange peel	¾ oz.
Oil of cinnamon	75 grains.

Tonka Oil.

Tonka beans	1 lb.
Expressed oil of almond	4 lb.

Inclose the powdered tonka beans in a linen bag, which is hung into the cold oil and allowed to macerate for several weeks. The same process is employed for the following:

Vanilla Oil.

Vanilla	7 oz.
Almond oil	4 lb.

Or,

Vanillin	80 grains.
Expressed oil of almond	4 lb.

CHAPTER XXIV.
PREPARATIONS FOR THE CARE OF THE MOUTH.

Besides the red lips and the gums, the teeth in particular ornament the mouth. Unfortunately there are but few persons who can boast of a perfectly healthy set of teeth, which is found as a normal condition only among savages and animals. The chief causes of the admitted fact that most persons have some defect in the mouth—bad teeth, pale gums, offensive odor—lie in part in our civilization with the ingestion of hot and sometimes sour food, in part in the lack of attention bestowed on the care of the mouth by many people. The care of the mouth is most important after meals and in the morning; particles of food lodge even between the most perfect teeth and undergo rapid decomposition in the high temperature prevailing in the mouth. This gives rise to a most disagreeable odor, and the decomposition quickly extends to the teeth.

Perfectly normal healthy teeth consist of a hard, brilliant external coat, the enamel, which opposes great resistance to acid and decomposing substances. But unfortunately the enamel is very sensitive to changes of temperature and easily cracks, thus admitting to the bony part of the teeth such deleterious substances and leading to their destruction. The bulk of the tooth consists of a porous mass of bone which is easily destroyed, and thus the entire set may be lost.

Hygienic perfumery is able to offer to the public means by which a healthy set of teeth can be kept in good condition and the disease arrested in affected teeth, and by which an agreeable freshness is imparted to the gums and lips. While true perfumes may be looked upon as more or less of a luxury, the hygiene of the mouth is a necessity; for we have to deal with the health and preservation of the important masticatory apparatus which is necessary to the welfare of the whole body, so that the æsthetic factor occupies a secondary position, or rather results as a necessary consequence from a proper care of the mouth.

With no other hygienic article have so many sins been committed as with those intended for the teeth; we have had occasion to examine a number of tooth powders, some of them very high-priced, which were decidedly injurious. Thus we have known of cases in which powdered pumice stone, colored and perfumed, has been sold as a tooth powder. Pumice stone, however, resembles glass in its composition and acts on the teeth like a fine file which rapidly wears away the enamel and exposes the frail bony substance. It needs no further

explanation to prove the destructive effects of such a powder on the teeth.

Many person prize finely powdered wood charcoal as a tooth powder, and to some extent they are right. Wood charcoal always contains alkalies which neutralize the injurious acids, besides traces of products of dry distillation which prevent decomposition. But these valuable properties are counteracted by the fact that charcoal is always more or less gritty, or, being insoluble, will lodge between the teeth and form the nucleus for the lodgement of other substances.

In compounding articles for the mouth and teeth—tooth powders and mouth washes—the objects aimed at are to neutralize the chemical processes that injure the teeth and gums, and to restore freshness and resisting power to the relaxed gums and mucous membranes.

Remnants of food left in the mouth after meals soon develop acids which attack the teeth; they are neutralized by basic substances or alkalies which counteract them.

The formation of organic acids from food remnants is caused by microscopic fungi (schizomycetes) which adhere to the teeth (so-called tartar) in the absence of cleanliness; against these parasites there are at our disposal a number of substances which kill them rapidly and thus for a time arrest the process of decomposition; they are therefore called antiseptics.

Another group of ingredients acts especially on such abnormal conditions of the membranous and fleshy parts of the mouth as manifest themselves by colorless, easily bleeding gums. It is mainly compounds of the tannin group which strengthen the gums and are known as astringents.

In compounding articles for the teeth it has thus far unfortunately not been customary to combine several of the substances having the above properties, the general rule being to incorporate only one in the composition, and some so-called tooth lotions consist even of aromatics alone. Such articles perfume the mouth, but have no hygienic effect upon it.

Among the essential oils, however, there is one which should form a part of every article intended for the care of the mouth, provided it can remain unchanged in the presence of the other ingredients, which would not be the case where permanganate of potassium is used. Oil of peppermint and other mint oils exert a very refreshing influence on the mucous membranes of the mouth, in which they leave a sensation of freshness lasting for some time.

We give below a number of formulas for the manufacture of articles for the care of the mouth, as to the value of which the reader can form his own opinion from what has been stated. Finally it may be observed that several of the so-called secret preparations for the care of the mouth are arrant humbugs, worthless substances being sold at exorbitant prices and, worse yet, lacking the vaunted hygienic effect owing to their chemical composition.

The articles for the care of the mouth and teeth may be divided into tooth pastes, tooth powders, tooth tinctures or lotions, and mouth washes.

A. Tooth Pastes.

Tooth Soap (Savon Dentifrice).

Soap	2 lb.
Talcum	2 lb.
Orris root	2 lb.
Sugar	1 lb.
Water	1 lb.
Oil of clove	150 grains.
Oil of peppermint	¾ oz.

The soap should be good, well-boiled tallow soap; it is mixed with the other ingredients (the sugar is to be previously dissolved in the water) by thorough and prolonged stirring, and is usually sold in shallow porcelain boxes. The talcum or French chalk is a soft mineral with a fatty feel and is a common commercial article.

This tooth soap and other similar preparations for the care of the mouth are frequently colored rose red. Of course only harmless colors can be used. The most appropriate are rose madder lake and carmine.

Tooth Paste (Pâte Dentifrice).

Prepared chalk	2 lb.
Orris root	2 lb.
Sugar	2 lb.
Water	1 lb.
Madder lake	¾ to 1½ oz.

Oil of lavender	150 grains.
Oil of mace	150 grains.
Oil of clove	150 grains.
Oil of peppermint	1 oz.
Oil of rose	150 grains.

The prepared chalk used in this and many other articles is pure *precipitated* carbonate of lime. It is made from pieces of white marble, the offal from sculptors' workshops, which are placed in wide porcelain or glass vessels and covered with hydrochloric acid, when abundant vapors of carbonic acid are given off. When the development of carbonic acid has ceased, the liquid is allowed to stand at rest for several days with an excess of marble, whereby all the iron oxide is separated. This is necessary, otherwise the preparation would not be white, but yellowish. The liquid is filtered and treated with a solution of carbonate of soda (sal soda), in water as long as any white precipitate results. This precipitate is washed with pure water on a filter, and when slowly dried it forms a fine, brilliant white powder. Crystalline calcium chloride may also be purchased, dissolved in water, and treated with the soda solution to obtain the white precipitate. The quantity of madder lake in the above formula is given within the limits to form light or dark red tooth paste.

B. Tooth Powders.

Quinine Tooth Powder.

Prepared chalk	2 lb.
Starch flour	1 lb.
Orris root, powdered	1 lb.
Sulphate of quinine	¾ oz.
Oil of peppermint	150 grains.

Cinchona Bark Tooth Powder.

Cinchona bark, powdered	1 lb.
Prepared chalk	2 lb.
Myrrh, powdered	1 lb.
Orris root, powdered	2 lb.
Cinnamon, powdered	1 lb.

Carbonate of ammonia	2 lb.
Oil of clove	¾ oz.

Borated Tooth Powder.

Borax, powered	1 lb.
Prepared chalk	2 lb.
Myrrh, powdered	½ lb.
Orris root, powdered	½ lb.
Cinnamon, powdered	½ lb.

Homœopathic Chalk Tooth Powder.

Prepared chalk	4 lb.
Starch flour	5½ oz.
Orris root, powdered	½ lb.
Oil of cinnamon	1 oz.

Camphorated Chalk Tooth Powder.

Prepared chalk	4 lb.
Camphor	1 lb.
Orris root, powdered	2 lb.
Cinnamon, powdered	½ lb.

Charcoal Tooth Powder.

Charcoal, powdered	4 lb.
Cinchona bark, powered	1 lb.
Oil of bergamot	½ oz.
Oil of lemon	1 oz.

The charcoal must be derived from some soft wood; willow, poplar, or buckthorn are among the most appropriate.

Cuttlefish-Bone Tooth Powder.

Prepared chalk	4 lb.

Cuttlefish-bone, powdered	2 lb.
Orris root, powdered	2 lb.
Oil of bergamot	¾ oz.
Oil of lemon	1½ oz.
Oil of neroli	150 grains.
Oil of orange	¾ oz.

Cachous Aromatisées.

Cachous are of a pillular composition, and used not so much for the teeth as to impart fragrance to the breath.

They are made as follows:

Gum acacia	1½ oz.
Catechu, powdered	2¾ oz.
Licorice juice	1¼ lb.
Cascarilla, powdered	¾ oz.
Mastic, powdered	¾ oz.
Orris root, powdered	¾ oz.
Oil of clove	75 grains.
Oil of peppermint	½ oz.
Tincture of ambergris	75 grains.
Tincture of musk.	75 grains.

Boil the solids with water until a pasty mass results which becomes firm on cooling. The aromatics are then added, and the mass is rolled into pills which are covered with genuine silver foil. One of these pills suffices to remove the odor of tobacco, etc., completely from the mouth.

Pastilles Orientales.

Sugar	8 lb.
Carmine	75 grains.
Gum acacia	2 lb.
Musk	15 grains.
Oil of rose	75 grains.

Oil of vetiver	15 grains.
Civet	15 grains.
Tartaric acid	150 grains.

Add the essential oils to the powdered solids, mix intimately, and add enough water to form a stiff dough, to be made into pills which when chewed remove the odor of tobacco or other unpleasant odors.

Rose Tooth Powder.

Prepared chalk	4 lb.
Orris root, powdered	2 lb.
Madder lake	1¾ to 2½ oz.
Oil of rose	½ oz.
Oil of santal	150 grains.

Sugar Tooth Powder.

Bone-ash	4 lb.
Orris root, powdered	4 lb.
Sugar, powdered	2 lb.
Oil of bergamot	¾ oz.
Oil of citron	½ oz.
Oil of mace	75 grains.
Oil of neroli	75 grains.
Oil of orange	150 grains.
Oil of rosemary	¾ oz.

Chinese Tooth Powder.

Pumice stone	4 lb.
Starch flour.	1 lb.
Madder lake	1¾ oz.
Oil of peppermint	¾ oz.

The pumice stone must be ground into the *finest* powder and levigated, before being mixed with the other ingredients. Note our remarks on pumice stone on

page 258.

C. Tooth Tinctures (Lotions) and Mouth Washes (Essences Dentifrices).

Eau Anathérine.

Guaiac wood	3½ oz.
Myrrh	8 oz.
Cloves	5½ oz.
Santal wood	5½ oz.
Cinnamon	1¾ oz.
Alcohol	4 qts.
Rose water	2 qts.
Oil of mace.	75 grains.
Oil of rose	75 grains.
Oil of cinnamon	75 grains.

The solids are macerated in the alcohol, the essential oils are dissolved in the filtered liquid, and lastly the rose water is added.

Eau de Botot.

This tooth tincture, which is quite a favorite, is made in different ways; the compositions made according to the French and English formulas are considered the best. For this and many other tooth tinctures rhatany root is also frequently used. Rhatany root is derived from Krameria triandra, a South American plant. Its alcoholic tincture has a red color.

A. French Formula.

Anise	10 oz.
Cochineal	¾ oz.
Mace	150 grains.
Cloves.	150 grains.
Cinnamon	2¾ oz.
Alcohol	3 qts.
Oil of peppermint	¾ oz.

B. English Formula.

Tincture of cedar	4 qts.
Tincture of myrrh	1 qt.
Tincture of rhatany	1 qt.
Oil of lavender	¾ oz.
Oil of peppermint	1 oz.
Oil of rose	150 grains.

Borated Tooth Tincture.

Borax	5½ oz.
Myrrh	5½ oz.
Red santal wood	5½ oz.
Sugar	5½ oz.
Cologne water	1 qt.
Alcohol	3 qts.
Water	3 pints.

Macerate the myrrh and santal wood in the alcohol, then add the Cologne water, and lastly the sugar and borax dissolved in the water.

Camphorated Cologne Water.

Camphor	1 lb.
Cologne water	4 qts.

Cologne water with myrrh is made in the same way, by substituting a like weight of myrrh for the camphor.

Eau de Milan.

Kino	3½ oz.
Civet	75 grains.
Cinnamon	¾ oz.
Alcohol	5 qts.
Oil of bergamot	150 grains.

Oil of lemon	150 grains.
Oil of peppermint	¾ oz.

Kino contains an astringent, a variety of tannin, and forms a dark red solution with alcohol.

Eau de Mialhe.

Tincture of benzoin	¾ oz.
Tincture of tolu	¾ oz.
Tincture of vanilla	150 grains.
Kino	5½ oz.
Alcohol	5 qts.
Oil of anise.	75 grains.
Oil of peppermint	¾ oz.
Oil of star-anise	75 grains.
Oil of cinnamon	150 grains.

Myrrh Tooth Tincture.

Mace	1¾ oz.
Myrrh.	8 oz.
Cloves	8 oz.
Rhatany root.	8 oz.
Alcohol	5 qts.

Chloral Mouth Wash.

Chloral hydrate	1 oz.
Water	10 oz.

A small quantity of this, rinsed about the mouth, removes every trace of bad odor.

Potassium Permanganate Water.

Potassium permanganate	3½ oz.
Distilled water	5 qts.

Potassium permanganate easily dissolves in distilled water and forms a beautiful violet solution, a few drops of which are placed in a glass of water for use. This salt is one of the most valuable articles for the teeth; it has the property of readily giving off oxygen to organic substances and hence immediately destroys all odor in the mouth by oxidizing the organic bodies; it also removes at once the odor of tobacco smoke. After rinsing the mouth with this solution, it is well to use some peppermint water for polishing the teeth. This mouth wash leaves brown stains on linen and other materials as well as on the skin; such spots can only be removed with acids (hydrochloric, oxalic, etc.).

Salicylated Tooth Tincture.

Salicylic acid	1¾ oz.
Orange-flower water	30 grains.
Water	2 qts.
Alcohol	1 qt.
Oil of peppermint	30 grains.

Salicylic acid is a substance possessing strong antiseptic properties; therefore, when this mouth wash is used after meals, the occurrence of any bad odor, even in persons with defective teeth, is prevented and the progress of caries is arrested, so that the acid may be considered one of the most valuable substances in hygienic perfumery.

Dissolve the salicylic acid in the warm alcohol mixed with water; add to the still warm solution the orange-flower water and the oil of peppermint dissolved in some of the alcohol.

Eau de Salvia.

Oil of lemon.	¾ oz.
Oil of sage	1¾ oz.
Alcohol	1 qt.
Water	4 qts.

The essential oils are dissolved in the alcohol, and this solution mixed with the water.

Eau de Violettes.

Tincture of orris root	1 qt.
Rose water, triple	1 qt.
Alcohol	1 qt.
Oil of bitter almond	75 grains.
Oil of neroli	30 grains.

CHAPTER XXV.
COSMETIC PERFUMERY.

In cosmetic perfumery, use is made chiefly of articles which serve to beautify some parts of the body by artificial means; for instance, to impart to pale cheeks a youthful freshness or to restore to prematurely gray hair its original appearance. In so far as the former object is attained also by the preparations discussed in Chapters XXI., XXII., XXIII., and XXIV., they likewise belong to the domain of cosmetic perfumery; for health and beauty are inseparably connected.

Though we have separated hygienic from cosmetic perfumery, we have done so only in order to draw the line between preparations whose regular use really improves the bodily health, and those which temporarily cover a defect of certain parts of the body.

Cosmetics may also be divided into several groups—those for beautifying the skin, as paints and toilet powders; and those for the care of the hair. The latter are subdivided into hair washes, hair dyes, so-called hair tonics, depilatories, and preparations for dressing the hair, *i.e.*, for making it glossy and fixing it.

CHAPTER XXVI.
SKIN COSMETICS AND FACE LOTIONS.

The use of skin cosmetics and paints is of remote antiquity, but varies in different nations according to their civilization and their sense of beauty. While among certain Oriental nations dark blue rings around the eyes, with yellow lips and nails, pass for beautiful, the European prizes only a white skin with a delicate tinge of red; Italian ladies in the middle ages used the dark red juice of the fruit of the deadly night-shade as a paint, hence the name bella donna, *i.e.*, beautiful lady. (According to Matthiolus, the name *herba bella donna* arose from the fact that Italian ladies used a distilled water of the plant as a cosmetic.) Owing to its marked effect on the eyes, by dilating the pupil and increasing the lustre, this juice also heightens the brilliancy of the eye, though at the expense of its health.

While in the last century face-painting was a universal fashion, it is nowadays resorted to only by persons whose skin requires some artificial help. But nobody desires that the cosmetic should be perceptible on the skin. Hence it must be laid down as a rule that paints and all cosmetics should be so compounded that it is not easily possible to the observer to recognize that some artificial means has been employed for beautifying the skin.

We give below a number of such articles, which come as near as possible to this ideal without injuring the skin. As every skin cosmetic cannot but occlude the pores of the skin, it should be removed as soon as possible—an advice to be heeded particularly by actors and actresses, who must appear painted on the boards.

A. White Skin Cosmetics.

French White (Blanc Français).

Talcum	4 lb.
Oil of lemon	75 grains.
Oil of bergamot	75 grains.

The talcum must be reduced to the finest powder, levigated, dried, and then perfumed. Owing to its unctuous nature, it readily adheres to the skin, and as it has no effect on it and does not change color, it is the best of all powders.

Liquid Bismuth White; Pearl White (Blanc Perlé Liquide).

Subnitrate of bismuth	1 lb.
Rose water	1 qt.
Orange-flower water	1 qt.

When standing at rest, the subnitrate of bismuth sinks to the bottom, while the supernatant fluid becomes quite clear. The bottle must therefore be vigorously shaken immediately before use. When this preparation remains on the skin for some length of time, it loses its pure white color and becomes yellow, or darker, through the gradual formation of a black sulphur compound.

Venetian Chalk (Craie Venétienne).

is made exactly like the French white, above; the only difference between the two preparations is that the talcum for the latter is brought to a red heat, which, however, causes it in part to lose the power of adhering to the skin.

B. Red Skin Cosmetics (Rouges).

Rouge Végetal Rose Liquide.

Ammonia water	2 oz.
Carmine	1¼ oz.
Essence of rose (triple)	2½ oz.
Rose water	2 qts.

This superior preparation, which serves mainly for coloring the lips, is made as follows: Reduce the carmine to powder; macerate it in the ammonia in a three or four pint bottle for several days, add the other ingredients, and let it stand for a week under oft-repeated agitation. At the end of that time the bottle is left

undisturbed until the contents have become quite clear, when they are carefully decanted and filled into bottles for sale.

In order to obtain this preparation in proper form, only the finest carmine should be used. That known in the market as “No. 40” is the best. This alone will produce a cosmetic that, when brought in contact with the skin, will give a vivid red color.

In place of carmine, which requires the presence of ammonia if it is to remain in solution, the anilin color known as *eosine* may be used. Of this, very minute amounts will be sufficient to impart the proper tint. It is impracticable to give exact proportions, as these must be determined in each case by experiment. It is necessary to avoid an excess. The tint of a liquid colored by eosine may not appear deep, and yet when it is applied to the skin a decidedly deeper stain than was desired may be produced. Hence each addition of fresh coloring matter must be carefully controlled by a practical test.

Rouge en Feuilles.

Cut from thick, highly calendered paper circular disks about 2½ inches in diameter, and cover them with a layer of carmine containing just enough gum acacia to make it adhere to the paper. For use, the leaf is breathed on, a pledget of fine cotton is rubbed over it, and the adhering color is transferred to the skin.

Rouge en Pâte.

Carmine	1 oz.
Talcum	21 oz.
Gum acacia	1¾ oz.

The ingredients in finest powder are mixed in a mortar by prolonged trituration, then water is added in small portions to form a doughy mass to be filled into shallow porcelain dishes about the diameter of a dollar. If the rouge is desired darker for the use of actors and dark-complexioned persons, the proportion of carmine should be increased.

Rouge en Tasses.

Carthamin	1 oz.
Talcum powder	1 lb.

Gum acacia	1½ oz.
Oil of rose	15 grains.

This rouge, when dry, has a greenish metallic lustre; it is prepared and sold like rouge en pâte.

Bleu Végetal pour les Veines.

Venetian chalk	1 lb.
Berlin blue	1¾ oz.
Gum acacia	1 oz.

To the powdered solids add sufficient water to form a mass to be rolled into sticks. For use, a pencil is breathed on, rubbed against the rough side of a piece of white glove leather, and the veins are marked with the adhering color on the skin coated with pearl white. Of course, some dexterity is required to make the veins appear natural by the use of this blue color.

Rouge Alloxane (Alloxan Red; Murexide Paint).

Cold cream	1 lb.
Alloxan	75 grains.

Dissolve the alloxan in a little water and mix it intimately with any desired cold-cream. The mixture is white, but when transferred to the skin gradually becomes red. The preparation sold in Austria, etc., under the name of "Schnuda" is identical with this alloxan paint.

C. Face Lotions.

The skin often contains spots with marked color which are more or less unsightly; for instance, freckles, liver spots, mother's marks (nævi), etc. Unfortunately we know of no remedy which radically removes them; even chemical preparations with the most energetic effects, which of course must never be employed owing to their destructive action on the skin, cannot entirely do away with these dark spots which have their seat in the lower layers of the skin. But the public demands preparations for the removal of freckles, liver spots, etc., and—obtains them. We subjoin the formulas for several of such secret remedies, but declare emphatically that none of them will completely effect the desired result.

Freckle Milk (Lait Antéphelique).

Camphor	1¾ oz.
Ammonium chloride	¾ oz.
Corrosive sublimate	150 grains.
Albumen	3½ oz.
Rose water	2 lb.

We call attention to the fact that the sublimate (bichloride of mercury) is very poisonous and must be used with the greatest care.

Freckle Lotion.

Angelica root	1¾ oz.
Black hellebore root	1¾ oz.
Storax	¾ oz.
Oil of bergamot	150 grains.
Oil of citron	150 grains.
Alcohol	2 qts.

Macerate for a week and filter.

Eau Lenticuleuse.

Potassium carbonate	7 oz.
Sugar	¾ oz.
Orange-flower water	2 qts.
Alcohol	7 oz.

Lilionese I.

Potassium carbonate	14 oz.
Water	4 lb.
Rose water	14 oz.
Alcohol	7 oz.
Oil of rose	150 grains.
Oil of cinnamon	75 grains.

Lilionese II.

Rose water	2 qts.
Orange-flower water	1 qt.
Glycerin	1 lb.
Potassium carbonate	3½ oz.
Tincture of benzoin	¾ to 1¾ oz.

Add only enough of the alcoholic tincture of benzoin to render the liquid slightly opalescent or milky.

Lotion for Chapped Skin.

Glycerin	4 lb.
Water	1 qt.
Rose water	1 qt.

Color pale red with cochineal.

Eau de Perles.

White soap	1 lb.
Dissolved in: Water	4 qts.
Glycerin	2 lb.
Add: Rose water	1 qt.
Tincture of musk	150 grains.

To be colored bluish with some indigo-carmin.

Teint de Venus.

Alcoholic soap solution	2 qts.
Carbonate of potassium	3½ oz.
Extract of orange flower	3½ oz.

The soap solution is made as concentrated as possible, and the entire fluid colored with cochineal; in place of the extract of orange flower, other essences or extracts may also be employed. For use, some of the liquid is poured into the wash water.

Pulchérine.

Carbonate of potassium	14 oz.
Water	4 lb.
Orange-flower water	2 lb.
Alcohol	3½ oz.
Oil of neroli	150 grains.
Tincture of vanilla	¾ oz.

The preceding preparations owe their activity merely to the presence of carbonate of potassium which forms an emulsion with the fat of the skin and thus resembles in its effects a mild soap. The other ingredients only serve to render the composition fragrant.

D. Toilet Powders.

Toilet powders are used to impart whiteness and smoothness to the skin; hence they are merely a kind of dry cosmetic which are applied by means of a powder puff or a hare's foot. Their main ingredients are starch and talcum powders, perfumed and sometimes tinted a rose-red color. It is immaterial what kind of starch is used; rice, wheat, and potato starch are equally effective, provided they are clear white and in the finest powder. In some cases the bitter-almond bran remaining after the expression of the fixed oil and the preparation of the oil of bitter almond is likewise used for toilet powders. The more thoroughly these powders are rubbed into the skin, the whiter the latter becomes and the less easily can they be detected.

White Toilet Powder.

Fine levigated zinc white	1¾ oz.
Venetian talcum	1¾ oz.
Carbonate of magnesia	1¾ oz.
Oil of rose	20 drops.
Oil of orris	20 drops.

Mix intimately.

Pink Toilet Powder.

White toilet powder (see above)	5½ oz.
Carmine	8 grains.

Poudre de Pistaches.

Pistachio meal	10 lb.
Talcum	10 lb.
Oil of lavender	¾ oz.
Oil of rose	½ oz.
Oil of cinnamon	75 grains.

The oil must have been completely extracted from the pistachio meal, which is to be reduced to the finest powder.

Poudre à la Rose.

Starch powder	20 lb.
Carmine	¾ oz.
Oil of rose	½ oz.
Oil of santal	½ oz.
Oil of vetiver	150 grains.

Poudre à la Violette.

Starch powder	20 lb.
Orris root, in fine powder	10 lb.
Oil of bergamot	¾ oz.
Oil of lemon	¾ oz.
Oil of clove	150 grains.
Oil of neroli	150 grains.

Poudre Blanche Surfine (Poudre de Riz).

Starch powder	20 lb.
Subnitrate of bismuth	2 lb.
Oil of lemon	¾ oz.
Oil of rose	150 grains.

Blanc de Perles Sec (Dry Pearl White).

Venetian chalk	20 lb.
Subnitrate of bismuth	42 oz.
Zinc white	42 oz.
Oil of lemon	1½ oz.

Anti-Odorin.

Starch powder	1 lb.
Salicylic acid	150 grains.

This mixture, which is best left unperfumed, does excellent service when used to prevent an offensive odor in stockings or shoes. The inside of the stockings is dusted with the powder, and every week a teaspoonful is sprinkled into the shoes.

Skin Gloss.

Carbonate of potassium	1¾ oz.
Powdered spermaceti	1¾ oz.
Starch powder	1 lb.
Benzoin	¾ oz.
Oil of bitter almond	150 grains.

Mix intimately and preserve in well-closed boxes. For use, stir some into water.

Kaloderm.

Wheat flour	4 lb.
Almond bran	1 lb.
Orris root, in fine powder	1 lb.
Extract of rose	1 pint.
Glycerin	6 fl. oz.

Form into a dough which is thinned with water and painted on the skin.

Musk Paste (for Washing the Hands).

Powdered white soap	2 lb.
Orris root, in fine powder	½ lb.
Starch powder	1½ oz.
Oil of lemon	¾ oz.
Oil of neroli	150 grains.
Tincture of musk	1½ fl. oz.
Glycerin	12 fl. oz.

Rub the starch with the glycerin in a mortar until they are thoroughly mixed. Then transfer the mixture to a porcelain capsule and apply a heat gradually raised to 284° F. (and not exceeding 290° F.), stirring constantly, until the starch granules are completely dissolved, and a translucent jelly is formed. Then gradually incorporate with it the powdered soap and orris root, and lastly the oils and tincture.

CHAPTER XXVII.
HAIR COSMETICS.

The number of preparations used for the care of the hair and beard is considerable. Unfortunately we are forced to admit that the majority of them, especially those said to strengthen the scalp and to stimulate the growth of the hair, are utterly inert. Thus far we know too little of the natural conditions of growth of the hair to enable us to compound remedies which would actively aid the efforts of nature in this direction.

In like manner we cannot speak with approval of the preparations used to color the hair, either from a chemico-sanitary or from an æsthetic standpoint; many of them contain substances which positively injure the hair or impart to it an unnatural color which is detected at first sight. But a well-made cosmetic should never produce this effect, and nature must be faithfully imitated if the preparation is to deserve the name of a cosmetic.

With the so-called hair and beard elixirs almost incredible swindles are perpetrated; the practical perfumer, however, cannot advise against the use of such worthless preparations among his goods, as they are in daily demand. This is the reason why we furnish the formulas for some of these secret preparations; anybody at all familiar with the principles of chemistry and physiology will recognize their worthlessness from their composition. The only articles of practical value are those intended for cleansing the hair, for making it soft and glossy, some of the hair dyes, and the preparations for fixing the hair in certain positions.

A. Hair Washes.

Eau d’Athènes.

Carbonate of potassium	2½ oz.
Sassafras wood	8 oz.
Rose water	4 qts.
Orange-flower water	4 qts.
Alcohol	1 qt.

Macerate the ingredients for one month. The carbonate of potassium and the alcohol cleanse the hair and remove the fat. After using this wash and drying the hair, its fat and gloss should be restored by the application of a good pomade or hair oil.

Eau Glycerinée aux Cantharides.

Ammonia water	3½ oz.
Tincture of cantharides (see below)	3½ oz.
Rosemary water	8 qts.
Glycerin	10½ oz.
Oil of rose	¾ oz.

The tincture of cantharides is made by macerating 1¾ oz. of powdered Spanish flies (Lytta vesicatoria) in one quart of strong alcohol. The caustic ammonia has a similar cleansing effect as the carbonate of potassium; the glycerin makes the hair soft; the entire preparation is a happy combination, as it cleanses and softens the hair at the same time.

Eau de Fleurs; Extrait Végétal.

Extract of cassie	7 oz.
Extract of jasmine	7 oz.
Extract of orange flower	7 oz.
Tincture of tonka	3½ oz.
Extract of tuberose	7 oz.
Tincture of vanilla	3½ oz.
Rose water	2 qts.
Alcohol	2 qts.

Eau de Laurier.

Carbonate of ammonium.	5½ oz.
Borax	5½ oz.
Oil of sweet bay	½ oz.
Oil of rose	75 grains.
Rose water	5 qts.

Eau de Romarin.

Carbonate of potassium	1¾ oz.
Rosemary water	4 qts.
Essence of rose (triple)	1 qt.

Eau Saponique.

Rose water	5 qts.
Rondeletia perfume	10½ oz.
Saffron	75 grains.
Soap	1 oz.
Alcohol	10½ oz.

Boil the finely divided soap and the saffron with some distilled water until the soap is completely dissolved, add the other ingredients, mix intimately, and let stand for some days to allow the coarser particles of saffron to settle. This preparation has a particularly handsome appearance; in cut-glass bottles it shows a peculiar opalescence or iridescence; in transmitted light it represents an almost perfectly transparent, saffron-yellow liquid.

Eau Victoria.

Ammonia water	1 oz.
Expressed oil of almond	1 oz.
Oil of mace	75 grains.
Oil of nutmeg	75 grains.
Essence of rosemary	21 oz.
Rose water	4 lb.

Mix the ingredients, except the rose water, by vigorous agitation until a kind of emulsion results. Then add the rose water in small portions, shaking after each addition.

Eau de Roses.

Rose water	5 qts.
Oil of rose	75 grains.

Dissolve in	
Alcohol	3½ oz.
And add	
Tincture of vanilla	1¾ oz.
Tincture of civet	150 grains.

B. Hair Tonics.

Hair Restorer.

Tincture of cantharides (see above, page 281)	1¾ oz.
Tincture of nut-galls	1¾ oz.
Extract of musk	150 grains.
Carmine	75 grains.
Alcohol	3½ oz.
Rose water	1 qt.

Tincture of nut-galls is made by macerating 3½ oz. of powdered nut-galls in one quart of alcohol. The tincture of cinchona in the following formula is prepared in the same manner.

Tanno-Quinine Hair Restorer.

Tincture of cinchona	1¾ oz.
Tincture of nut-galls	1¾ oz.
Carmine	150 grains.
Oil of neroli	75 grains.
Oil of nutmeg	75 grains.
Alcohol	3½ oz.
Rose water	1 qt.
Orange-flower water	1 qt.

Baume de Milan pour les Cheveux.

Lard	1 lb.
Expressed oil of almond	1 lb.
Spermaceti	1¾ oz.

Carmine	150 grains.
Tincture of cantharides	¾ oz.
Tincture of storax	1 oz.
Tincture of tolu	1 oz.

Beard Producer.

Lard	1 lb.
Expressed oil of almond	1 lb.
Spermaceti	¾ oz.
Cantharides	¾ oz.
Carmine	150 grains.
Oil of bergamot	75 grains.
Oil of lavender	75 grains.
Oil of santal	75 grains.

Rub the cantharides with the carmine to the finest possible powder; add this with the essential oils to the other ingredients.

Formulas for similar hair tonics might be given to the number of several hundreds; but we repeat what we have said above—they do not produce the desired result.

While the well-known bay rum is used more as a face lotion or refreshing skin tonic, particularly after shaving, or when perspiring in hot weather, yet it is also often used as a wash for the scalp, and is popularly believed to stimulate the growth of hair, which is in reality not the case. We shall therefore give a formula for its preparation here:

Bay Rum.

Oil of bay (from Myrcia acris)	240 grains.
Oil of orange (bigarade)	16 grains.
Oil of Pimenta	16 grains.
Alcohol	1 qt.
Water	25 fl. oz.

Dissolve the oils in the alcohol and add the water. Mix the liquid with about 2

oz. of precipitated phosphate of lime, and filter. It will improve by age.

Genuine bay rum is imported from the West Indies (St. Thomas, etc.), where a crude kind of alcohol, obtained in connection with the manufacture of rum from molasses, is distilled with the fresh leaves of the bay-tree (Myrcia acris). The oil of bay obtained from this must not be confounded with the oil of sweet bay. The latter, as it appears in commerce, is a crude mixture of a fixed with a volatile oil.

CHAPTER XXVIII.
HAIR DYES AND DEPILATORIES.

The custom of dyeing the hair is universal in the Orient; in the Occident, however, hair dyes are also frequently used, namely, to hide the grayness of the hair, sometimes to give the hair a preferred color. Hair dyes, which are very numerous, may be divided into groups—those containing the dye-stuff ready formed, and those in which it is produced in the hair by some chemical process. Some hair dyes contain substances which in their nature are decidedly injurious to the hair; such articles, of course, must be dispensed with because, if frequently employed, they would certainly lead to baldness. We shall return to this subject in connection with the several preparations.

Regarding the use of hair dyes, especially those consisting of two separate portions, we may state that it is necessary to remove the fat from the hair before applying the dye, as the chemicals in question do not adhere well to fat. The hair should be thoroughly washed once or twice with soap, and dyed when nearly dry.

When dyeing the hair the preparations should first be diluted; if the color is not deep enough, the process is repeated. If the preparation is used at once in a concentrated form, a color may result which has no resemblance to any natural tint; hair meant to be black may assume a metallic bluish-black gloss.

A. Simple Hair Dyes.

Lead Hair Dye.

Oxide of lead	4 lb.
Quicklime	1 lb.
Calcined magnesia	1 lb.

The ingredients are rubbed to a very fine powder and for use are mixed with water, applied to the hair, and left there until the desired tint—light brown to black—is obtained, from four to twelve hours, when the powder is removed by washing. The lime by its caustic effect acts destructively on the horny substance of the hair. Moreover, *all lead preparations* without exception are *very injurious* to the organism; hence this hair dye is to be rejected, especially as there are

harmless preparations which produce the same effect.

KARSI (TEINTURE ORIENTALE).

Ambergris	75 grains.
Nut-galls	4 lb.
Iron filings	1¾ oz.
Copper filings	30 grains.
Musk	30 grains.

This preparation, which really comes from the Orient, is made as follows: Reduce the nut-galls to a very fine powder and roast them in an iron pan under continual stirring until they have become dark brown or almost black. This powder is triturated with the metals in fine powder and the aromatics, and preserved in a moist place. For use, some of the powder is moistened in the palm of the hand and vigorously rubbed into the hair; after a few days it assumes a deep black, natural color. The roasting changes the tannin bodies contained in the galls into gallic and pyrogallic acids which form deep black combinations with the metals, and themselves are easily transformed into brownish-black substances.

KOHOL (TEINTURE CHINOISE).

Gum arabic	1 oz.
India ink	1¾ oz.
Rose water	1 qt.

Powder the ink and the gum, and triturate small quantities of the powder with rose water until a uniform black liquid results, which must be free from granules. This liquid is placed in a bottle and the rest of the rose water added. Kohol can be used only by persons with black hair, and is employed particularly for dyeing the eyebrows. As the coloring matter of this preparation consists of carbon in a state of fine division, the dye is perfectly harmless.

VEGETABLE DYE.

Silver nitrate	2 oz.
Distilled water	1 qt.

This hair dye produces a deep black color, but cannot be recommended, as it is injurious to the hair. Its full effects appear only after the lapse of some hours.

POTASSIUM PERMANGANATE.

Potassium permanganate	5½ oz.
Distilled water	2 qts.

Crystalline potassium permanganate is soluble in water, forming a dark violet solution. When brought in contact with an organic substance—paper, linen, skin, horn, hair—it is rapidly decolored and imparts to the substances named a brown tint due to hydrated oxide of manganese. The hair is washed, as stated above, to remove the fat, and the dilute solution applied with a soft brush; the color is produced at once and according to the degree of dilution this innocuous preparation can be made to give any desired color from blond to very dark brown. Of course, this preparation can be used for the beard as well as the hair.

All the hair dyes here and elsewhere given stain the skin as well wherever they come in contact with it; hence care should be taken to protect the skin during their application.

B. Double Hair Dyes.

SILVER HAIR DYES.

This and similar hair dyes consist of two preparations, preserved in bottles I. and II.; the latter, containing the silver solution, should be of dark amber-colored or black glass, as the silver salts are decomposed by light. It is utterly useless to employ blue glass for this purpose, as this admits the chemical rays of light as easily as flint glass. For use, some of the liquid from bottle I. is poured into a cup and the hair is moistened with it by means of a soft brush. The liquid from bottle II. is poured into a second cup and applied with another brush.

BROWN DYE.

I. (*In White Bottle.*)

Sulphide of potassium	7 oz.
Alcohol	1 qt.

II. (*In Dark Bottle.*)

Silver nitrate	4¼ oz.
Distilled water	1 qt.

BLACK DYE.

I. (*In White Bottle.*)

Sulphide of potassium	½ lb.
Alcohol	1 qt.

II. (*In Dark Bottle.*)

Silver nitrate	5½ oz.
Distilled water	1 qt.

The sulphide of potassium (liver of sulphur) appears in fragments of a liver-brown mass which readily dissolves in water. The solution must be filtered before being filled into bottles for sale, and, as it becomes turbid in the air, kept in well-closed vessels. When the two solutions are brought together, black sulphide of silver results and darkens the hair. After the use of this preparation a disagreeable odor of rotten eggs adheres to the hair, but can be easily removed by washing, especially with one of the previously mentioned hair washes.

The silver hair dye will be still better if the liquid contained in bottle II. is made by dropping into the solution, under continual stirring, ammonia water, until the precipitate first formed is again dissolved.

Melanogène.

I. (*In Dark Bottle.*)

Silver nitrate	150 grains.
Distilled water	2¾ oz.
Ammonia water	1 oz.

II. (*In White Bottle.*)

Pyrogallic acid	15 grains.
Alcohol of 40%	1 pint.

Tannin Hair Dye.

I. (*In White Bottle.*)

Powdered nut-galls	14 oz.
Water	1 pint.
Rose water	1 pint.

Boil the nut-galls in the water, strain the boiling liquid through a thick cloth into the rose water, and fill the still hot mixture into bottles which must be immediately closed. (It is essential that the liquid be hot during the filling, to guard against the development of mould.)

II. (*In Dark Bottle.*)

Silver nitrate	5½ oz.
Distilled water	1 qt.

Add ammonia water to the silver solution until the precipitate first formed is again dissolved.

Eau d'Afrique.

I. (*In Dark Bottle.*)

Silver nitrate	45 grains.
Distilled water	3½ oz.

II. (*In White Bottle.*)

Sulphide of sodium	120 grains.
Distilled water	3½ oz.

Crinochrom.

I. (*In White Bottle.*)

Pyrogallic acid	150 grains.
Distilled water	6¼ oz.
Alcohol	5¾ oz.

II. (*In Dark Bottle.*)

Silver nitrate	180 grains.
Ammonia water	2 oz.
Distilled water	10½ oz.

Copper Hair Dye.

I. (*In White Bottle.*)

Ferrocyanide of potassium	7 oz.
Distilled water	1 qt.

II. (*In Dark Bottle.*)

Sulphate of copper	7 oz.
Distilled water	1 qt.

Add ammonia water to the copper solution until the light blue precipitate first formed again dissolves to a rich, dark blue liquid. This hair dye gives a dark brown color.

Eau de Fontaine de Jouvence,

also called Auricome and Golden Hair Water, is no dye, but a bleaching agent which changes dark hair to a light blond or golden-yellow color. The preparation consists of peroxide of hydrogen, a substance possessing marked bleaching properties.

Peroxide of hydrogen, or hydrogen dioxide, is at the present time made on a large scale by many manufacturers, and readily obtainable in the market. It would therefore scarcely pay any one to prepare it himself unless he were out of reach of the usual channels of trade, so that he could not obtain the preparation in a *fresh* state. Nevertheless it may be useful to state how it is made. Barium dioxide (or peroxide), which is a regular article of commerce, and is a stable compound which will keep for any length of time if kept in tightly closed bottles, is treated with water until the dioxide forms with it a thin, smooth milk. This is gradually added to dilute sulphuric acid, cooled with ice or kept otherwise as cold as possible, until the sulphuric acid is almost entirely neutralized. The solution is then allowed to settle and the clear liquid drawn off. For bleaching purposes, this is pure enough. Only it must be ascertained that the amount of free acid present, without which the hydrogen dioxide does not keep well, is only small. Other acids can be used besides sulphuric, but the latter is the most convenient. If an alkali is added to hydrogen dioxide so that the reaction becomes alkaline, it will decompose very rapidly. Even under the most favorable circumstances (when acid, and kept in a cool place) it will gradually deteriorate, and finally be entirely converted into oxygen gas, which escapes, and plain water.

Peroxide or dioxide of hydrogen, when applied to the hair as a bleaching agent, must be used in a dilute condition at first. Those who use it for the first time should always make preliminary trials with the liquid upon odd bunches of hair (such as may at any time be procured at hair-dressers' shops) resembling

that which is to be bleached, before actually applying it to the latter.

The hair to be bleached is deprived of fat by washing with soap solution, the soap is washed out with water, and the peroxide of hydrogen applied.

Whisker Dye.

I. Acetate of lead	1¾ oz.
Distilled water	1 pint.
II. Caustic potassa	¾ oz.
Distilled water	1 qt.

Dissolve the acetate of lead ("sugar of lead") in the warm water, filter the solution, and add ammonia water until a precipitate ceases to form. Collect the precipitate on a filter, wash it by pouring distilled water over it eight or ten times, and while still moist introduce it into solution II. Stir repeatedly, and after twelve hours leave the vessel at rest until the solution has become clear. Then decant it from the sediment, which may be treated a second time with solution II. For use, the beard is washed with soap, and combed with a fine rubber comb dipped in the solution.

C. Depilatories.

Combinations of sulphur with the alkaline metals calcium, barium, and strontium rapidly destroy the hair; for this reason tanners use the "gas lime" from gas works, which contains calcium sulphide, for removing the hair from hides. All the depilatories used cosmetically, even rhusma employed in the Orient for removing the beard, owe their activity to the presence of calcium sulphide.

Calcium Sulphide

has usually been lauded as a perfectly harmless depilatory. This is a great mistake, however, since it has often done serious harm, through careless application by persons unfamiliar with its caustic and corrosive effects. It is absolutely necessary to protect the *skin* against its action; otherwise superficial irritation, or even destruction of the skin may result.

Calcium sulphide cannot be made by the action of sulphuretted hydrogen upon lime. It is usually made by heating at a low red heat, in a securely closed

crucible, an intimate mixture of 100 parts of finely powdered quicklime with 90 parts of precipitated sulphur. Mix together:

Calcium sulphide	4 oz.
Sugar	2 oz.
Water	2 oz.
Starch powder	2 oz.
Oil of lemon	30 grains.
Oil of peppermint	10 grains.

The resulting mass must be filled at once into an air-tight jar, as the calcium sulphide is decomposed in the atmosphere. For use, some of the mass is moistened with water, painted on the skin, and washed off with water after thirty to forty-five minutes. This and all other depilatories act only temporarily, that is, they destroy only the hair projecting above the surface without killing the hair bulbs; after some time the hair grows again and the preparation must be reapplied.

Barium Sulphide,

which is likewise used as a depilatory, is made by heating barium sulphate with charcoal, extracting the residue with water, and mixing the resulting product with starch paste. In its effects barium sulphide equals the preceding preparation, but it decomposes more readily.

Depilatory Paste.

Powdered caustic lime	2 lb.
Starch powder	2 lb.
Sodium sulphide	21 oz.

Sodium sulphide is made by saturating strong caustic soda solution with sulphuretted hydrogen. The other ingredients are added to the solution of sodium sulphide.

Rhusma

is a depilatory made by mixing powdered quicklime (unslaked) with orpiment (yellow sulphide of arsenic). Take of:

Quicklime 4 lb.
Orpiment 10½ oz.

Mix intimately and preserve the powder in tightly closed vessels. For use, take some of the powder, reduce it to a thin paste with water, and apply it to the place upon which the hairs are to be destroyed. Owing to its poisonousness and the destructive effects of the caustic lime on the skin, this preparation should never be employed in cosmetic perfumery.

CHAPTER XXIX.
WAX POMADES, BANDOLINES, AND BRILLIANTINES.

The so-called wax pomades, stick pomatum, and bandolines serve to stiffen the hair and are frequently employed by hair dressers. The former two articles possess some adhesive power by which they fasten the hair together; bandolines are mucilaginous fluids which generally contain bassorin (or vegetable mucilage present in tragacanth), quince seeds, etc.

A. Wax Pomades.

Stick Pomatum.

This is usually formed into oval or round sticks which are wrapped in tin foil. They are colored and perfumed as desired. The ordinary varieties are: white, for light blond hair, which is left uncolored; pink, colored with carmine; brown, colored with umber; and black, colored with bone black. The coloring matters are always rubbed up with oil. Red pomatum may be colored with alkanet root, which is macerated for some time with the melted fat. The base of these preparations consists of:

Lard	4 lb.
Tallow	12 lb.
Wax	6 lb.

The mass may be made harder or softer by increasing or diminishing the wax. The perfumes generally used are oils of bergamot, lemon, clove, and thyme, with an addition of some Peru balsam.

B. Beard Wax.

Beard Wax (Cire à Moustaches).

Turpentine	2 lb.
Expressed oil of almond	2 lb.
Wax	6 lb.
Violet pomade	2 lb.

Peru balsam	1 lb.
Oil of clove	1 oz.
Oil of santal	¾ oz.
Oil of cinnamon	¾ oz.

Hungarian Beard Wax (Cire à Moustache Hongroise.)

Castile soap, powdered	3½ oz.
Mucilage of acacia	10 oz.
White wax	9 oz.
Glycerin	3½ oz.
Oil of bergamot	20 drops.
Oil of lemon	10 drops.
Oil of rose	10 drops.

Rub the powdered soap with the mucilage, previously diluted with nine ounces of water, then add the wax and glycerin, and heat the mass on a water-bath, stirring constantly, until it becomes homogeneous. Lastly add the oils, and pour the mass into suitable moulds.

For brown or black wax the corresponding color is added. The mass is formed into sticks the thickness of a lead pencil.

C. Bandolines.

Bandoline aux Amandes.

Tragacanth	14 oz.
Rose water	8 qts.
Oil of bitter almond	¾ oz.

Crush the tragacanth, place it in the rose water, and leave it at rest in a warm spot, stirring occasionally, until the tragacanth has swollen to a slimy mass. Press it first through a coarse and then through a finer cloth, add a little carmine and the oil of bitter almond.

Bandoline à la Rose.

This is made like the preceding, only substituting 1½ oz. of oil of rose for the

oil of bitter almond. Other varieties may be produced by the use of different odors.

D. Brillantines.

Under various names preparations are placed on the market which render the hair both soft and glossy. The chief constituent of all these articles is glycerin which is perfumed according to taste and stained reddish or violet. As many aniline colors easily dissolve in glycerin, they are generally used for this purpose. Formerly, before glycerin was obtainable in sufficient purity, brillantines were chiefly made of castor oil dissolved in alcohol, but aside from the fact that glycerin is cheaper than castor oil with alcohol, the former is preferable, as alcohol injures the hair.

Brillantine.

Glycerin	8 lb.
Extract of jasmine (or other flower)	2 qts.

Oléolisse.

Glycerin	4 lb.
Castor oil	4 lb.
Oil of bergamot	¾ oz.
Oil of lemon	¾ oz.
Oil of neroli	150 grains.

CHAPTER XXX.
THE COLORS USED IN PERFUMERY.

In perfumes in which next to the odor, the appearance is of importance, the colors play a prominent part.

In handkerchief perfumes, any accidental color present is an obstacle, as it would cause stains on the material. Hence the aim is to obtain the perfumes colorless or—a highly prized quality in fine articles—they receive a pale green color which disappears on drying. Extract of cassie possesses this color, and in many cases this extract is added to perfumes for the purpose of giving them this favorite color.

Regarding the colors employed for other articles—emulsions, pomades, soaps, etc.—it may be stated as a general rule that a preparation named after a certain flower must possess the color of the latter. Hence all perfumes named after the rose should be rose red; violet perfumes, violet; those bearing the name of the lily or white rose must be colorless, etc.

The best for articles containing alcohol or glycerin are the aniline colors, both on account of their beautiful appearance and their extraordinary staining power. But an insurmountable obstacle is met with in their use for articles containing animal or vegetable fats which rapidly destroy many aniline colors. When a rose pomade is colored with aniline red, the fine delicate tint hardly lasts three or four weeks and changes into dirty gray. The same is true of aniline violet in violet pomade, etc.

Therefore, articles containing fat must receive other dye-stuffs, and in the following pages we briefly enumerate those we have found most appropriate; but it must be observed that all poisonous dyes must be absolutely excluded. Commercial aniline colors formerly often contained arsenic; at the present time other processes are usually employed for their preparation, not involving the employment of arsenious acid.

Yellow Colors.

Saffron.

The stigmata of Crocus sativus contain a bright yellow or orange yellow

coloring matter which is easily extracted by alcohol, petroleum ether, or fat. We prefer petroleum ether in which the finely powdered saffron is macerated, the greater portion of the solvent being distilled off, and the rest of the solution is allowed to evaporate, when the pure coloring matter is left and can be easily mixed with fat. The coloring matter may also be obtained by macerating the saffron in melted lard or in olive oil.

Jonquille Pomade.

Genuine jonquille pomade, from Narcissus Jonquilla, has a handsome yellow color which is derived from the dark yellow flowers; for this reason small quantities of jonquille pomade are sometimes used for coloring pomades for the hair.

Curcuma or Turmeric.

Curcuma or turmeric root contains a very beautiful yellow coloring matter which is easily extracted by alcohol or petroleum ether. We prepare it in the same manner as stated under the head of saffron. Curcuma color cannot be used for articles containing free alkali, which changes it to brown.

Palm Oil.

has naturally a fine yellow color, which it imparts also to soaps prepared from it; but the color fades completely when the wet soap is exposed to the air.

Red Colors.

Carmine.

This magnificent, though very expensive color is obtained from the cochineal insect, Coccus cacti. If good carmine is not available, a substitute may be made, for the purpose of coloring perfumery articles, by powdering cochineal, treating it with dilute caustic ammonia, and, after adding some alum solution, exposing it to the air and direct sunlight, when the coloring matter separates in handsome red flakes, which are collected and dried.

Carthamin Red.

Safflower, the blossoms of Carthamus tinctorius, contains two coloring matters, yellow and red. The former is extracted with water from the dried flowers, and the residue is treated with a weak soda solution which dissolves the

red coloring matter. When this solution is gradually diluted with acetic acid, the dye is precipitated, and after drying forms a mass with a greenish metallic lustre. This, when reduced to powder, is used for rouge en feuilles or rouge en tasses.

This coloring matter can also be prepared by introducing into the soda solution some clean white cotton on which the color is precipitated and can then be extracted with alcohol.

Alkanet.

This root, which is readily obtained in the market, contains a beautiful red coloring matter which can be extracted with petroleum ether, but is also easily soluble in fats (melted lard or warm oil). Even small amounts of it produce a handsome rose red and larger quantities a dark purple. For pomades, hair oils, and emulsions alkanet root is the best coloring matter, as it stains them rapidly, is lasting, and cheap.

Rhatany.

Rhatany root furnishes a reddish-brown coloring matter which is soluble in alcohol and is extracted with it from the comminuted root, especially for tooth tinctures and mouth washes. For the same purpose use may also be made of red santal wood and Pernambuco wood which likewise yield to alcohol, besides astringents, beautiful colors which are very suitable for such preparations.

GREEN COLORS.

Chlorophyll.

The green coloring matter of leaves is easily extracted from them, when bruised, with alcohol, and is left behind after the evaporation of the solvent. Some powders which are to have a green color are mixed directly with dried and finely divided bright green leaves such as spinach, celery, parsley leaves, etc.

For soap it is customary to use a mixture of yellow and blue which together produce a green color. Take a yellow soap, melt it, and add to it the finest powder of smalt or ultramarine until the desired tint is obtained. Indigo-carmine cannot be used, as it would impart a blue color to the skin.

BLUE COLORS.

For many preparations smalt or ultramarine is employed, but these colors are

insoluble. The only soluble blue colors are aniline blue and indigo-carmine; the latter has a beautiful and intense color, but is suitable only for pomades and not for soaps because, as stated above, it would stain the skin.

Violet

is produced by a mixture of red and blue in due proportions.

Brown

is produced by caramel, which is made by heating sugar in an iron pot until it changes into a deep black mass which is brown only in thin threads. This color dissolves easily in water (not in alcohol) and is very suitable for soaps.

Black

is produced by finely divided vegetable or bone black. Liquids are colored with India ink which remains suspended for a long time owing to the fine division of the carbon.

CHAPTER XXXI.
THE UTENSILS USED IN THE TOILET.

In the toilet, besides combs and hair brushes, use is made of powder puffs, tooth brushes, and bath sponges. Powder puffs are made from swan skins, but should be used rather for the even division of the powder or paint than for its application. For the latter purpose a piece of soft glove or chamois leather is best.

The commercial tooth brushes are almost without exception objectionable owing to the stiffness of the bristles. A suitable tooth brush should be made of very soft, flexible bristles, lest it wear away the enamel.

Particular attention should be devoted to bath sponges. Their value is proportionate to the fineness of the pores, their softness and elasticity, and their spherical shape. Crude sponges are best cleansed by being placed in dilute hydrochloric acid which dissolves the calcareous particles adhering to them.

They are bleached as follows.

Free them as far as possible from sand and other foreign matters. Then wash them thoroughly with water, and press them. Next introduce them into a solution of permanganate of potassium containing one ounce of the salt in a gallon; leave them in this liquid two or three minutes; then take them out, express the liquid (which can be several times used over again), wash them with water until no more violet-tinted liquid runs from them, and then immerse them in a solution of one part of hyposulphite of sodium in twenty parts of water, to which immediately before dipping the sponges one part of hydrochloric acid has been added. When the sponge’s are white, remove them and wash them thoroughly with water.

After prolonged use, bath sponges lose their elasticity and softness. These properties can be restored by dipping the sponges into a mixture of one part by measure of glycerin and eight parts of water, pressing out the excess of the liquid and allowing them to dry. The small quantity of glycerin which they contain prevents their hardening.

INDEX.

Transcriber's Notes

Obvious typographical errors have been silently corrected. Variations in hyphenation have been standardised but all other spelling and punctuation remains unchanged.

The larger tables have been re-organised to fit more readily within page constraints.